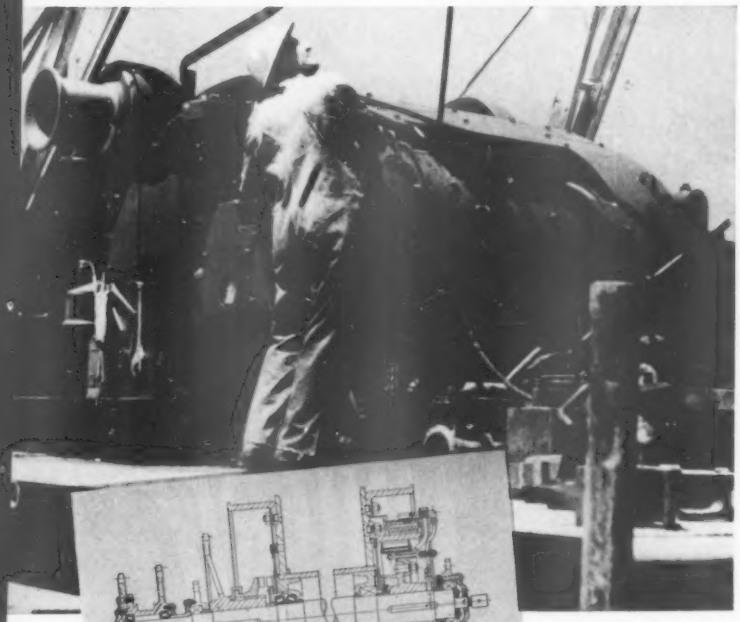
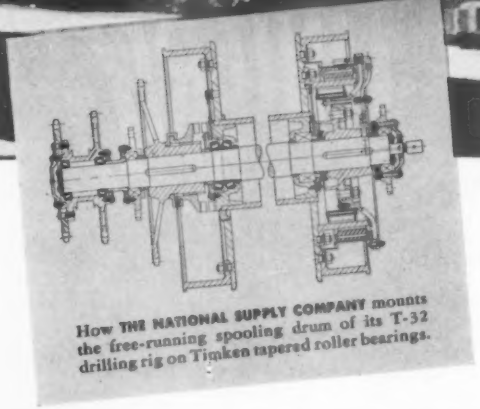
the GULF COAST OIL AND GAS JOURNAL
NUMBER ..... With Insert Map

Free-running spooling drum really runs free on TIMKEN® bearings





How THE NATIONAL SUPPLY COMPANY mounts the free-running spooling drum of its T-32 drilling rig on Timken tapered roller bearings.

THE free-running spooling drum on this National Supply Company T-32 drilling rig permits fast falling of the lightweight empty block. Empty—or when carrying its capacity load of drill pipe—the free-running drum really runs free. Big reason: it's mounted on Timken® tapered roller bearings.

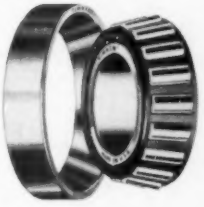
Because of their true rolling motion and incredibly smooth surface finish, Timken bearings practically eliminate friction, make wear negligible even under heavy loads.

Because the loads are carried on a line of contact between their rollers and races, Timken bearings provide load-carrying capacity to spare. They take the terrific shock loads because their rollers and races are case hardened to give them tough, shock-resistant cores and hard wear-resistant surfaces.

Timken tapered roller bearings also insure trouble-free operation in the sand reel shaft and in the pump drive countershaft sprocket.

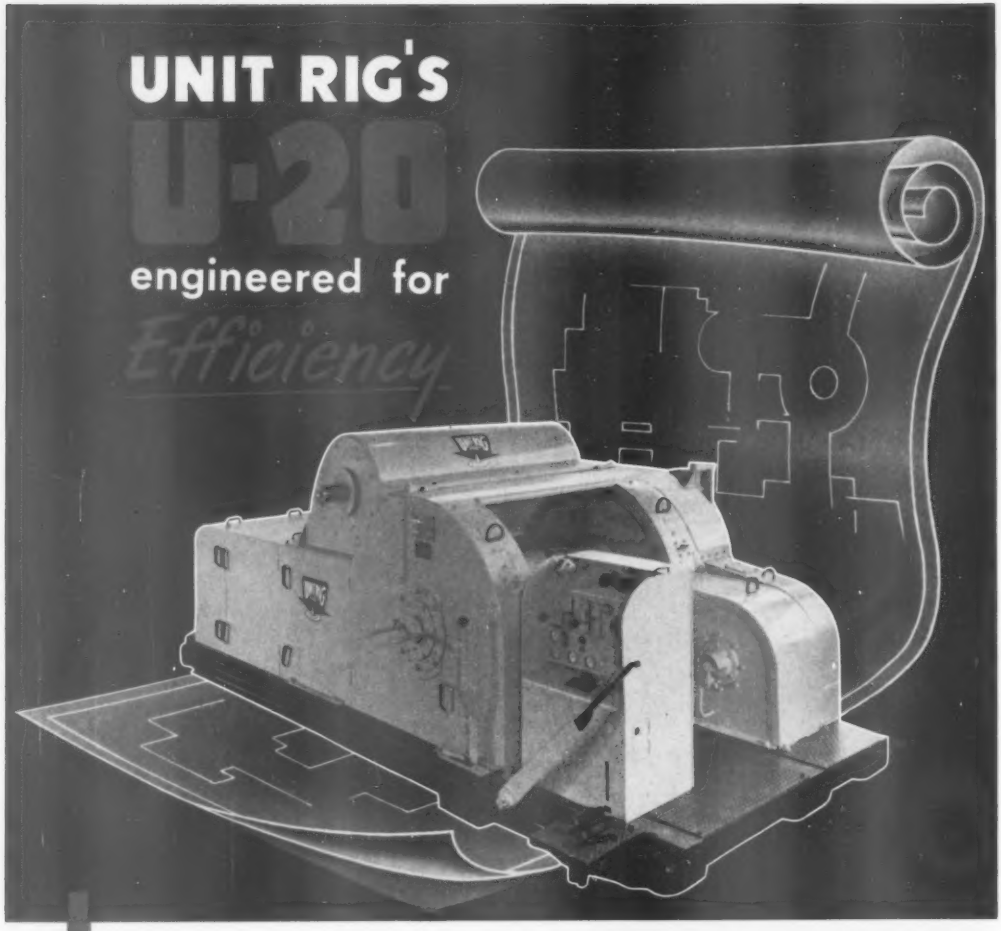
Be sure to specify Timken bearings in the oil drilling machinery you buy or build. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ⊂⊃ THE TIMKEN TAPERED ROLLER ⊂⊃ BEARING TAKES RADIAL ◎ AND THRUST →◎← LOADS OR ANY COMBINATION ✳

UNIT RIG'S U-20 engineered for Efficiency



Designed to offer the maximum in efficiency, the Model U-20 features:

COMPACTNESS — for ease of transportation. SPEED — for faster drilling. RUGGEDNESS — for longer life. ECONOMY — of operation for 7000 to 12000 ft. drilling. CONTROLS — planned for convenience of the driller. MINIMUM RIG UP TIME — with single package drawworks and transmission.

Buy Speed - - - Buy The Best - - - Buy The U-20

UNIT RIG & EQUIPMENT CO.
TULSA, OKLAHOMA U.S.A.

DESIGNED FOR THE JOB...

UNIT RIG DRAWWORKS ARE SOLD EXCLUSIVELY THROUGH THESE AUTHORIZED DISTRIBUTORS IN THE U.S.A. AND CANADA

BOVAIRD SUPPLY COMPANY
HOUSTON OIL FIELD MATERIAL COMPANY
HOWARD SUPPLY COMPANY
IVERSON SUPPLY COMPANY
JONES & LAUGHLIN SUPPLY COMPANY
LUCEY PRODUCTS CORPORATION
MID-CONTINENT SUPPLY COMPANY
NORWELL-WILDER SUPPLY COMPANY
OIL WELL SUPPLY COMPANY

EXPORT SALES — MIDCONTINENT SUPPLY COMPANY, 42 Broadway, New York City. Cable — MIDUNITRIG

UR-523

THE OIL AND GAS
JOURNAL
Vol. 51, No. 6

CONTENTS FOR JUNE 16, 1952

NEXT WEEK

• INFORMATIVE "HOW TO" ARTICLES . . . (1) "Production of High Purity Aromatics," (2) "Pipe Line Metering vs. Gaging," (3) "Finding More Flank Production on Piercement Type Salt Domes," (4) "Designing Water Treating Plants," (5) "More Service From Wire Lines." In addition, a comprehensive Journal-staff article on "Petroleum Radio." And, "Petrochem Report — Shell Chemical Co., Houston."

REGULAR DEPARTMENTS

They Say	157
Calendar of Events	161
Journally Speaking	165
Editorial	167
This Week	169
Watching Washington	174
International News	182
Personals	186
Deaths in the Industry	188
Drilling Contractors	395
Pipe-Line News	399
Refining News	403
Natural-Gas News	407
Natural-Gasoline News	407
Exploration Statistics	440
Production Statistics	441
Refining Statistics	442
Market Statistics	443
Equipment Men in News	444
Classified Advertising	448
Advertisers' Index	451

EXPLORATION— DEVELOPMENT

Monroe Gas Area	409
Highlights of Week	409
Reports by Areas	411

NEWS FEATURES

Gas Industry Seeking More Accurate Metering of Big-Inch Systems	170
New Unit Promotes Complete Oxidation of Combustible Waste Gases	171
Amerada Extends North Dakota Production Another 5 Miles North	171
Senate in Uproar Over Shady Plan to Administer Tidelands	172
Development of Refining in Europe Proves Surprising	173
Steel Supplies for Oil Industry Uncertain as Result of Strike	174
Research Responsible for Pennsylvania's Present Production	175
350 Engineers, Operators Study First Water Floods Near Nowata, Okla.	176
Derby Oil Describes Unusual Refining Feat at W.P.R.A. Meeting	177
Sunray Speeds Run-Ticket Computing With New "Electronic Brain"	178
Poor Public Relations Invites Government Control, Reistle Says	179
Loss of Refined Products Due to Strike Estimated at 50,000,000 Bbl.	180
Texas University Lease Sale Nets Record of $7,805,000 in Bonuses	181
Poland Expected to Remain Short of Oil; Russia Must Meet Deficit	182
Britain Importing Twice the Oil From Middle East as in Early '51	184
Mossadegh Speech Opens World Court Hearing on Iranian Oil Seizure	184

ENGINEERING-OPERATING FEATURES ON GULF COAST SUBJECTS

The Gulf Coast Today!	190-215
Special 20-page section on Gulf Coast, prepared by Journal's Houston office. Includes petrochemistry, refining, natural gas and gas pipe lines, crude-oil production, development drilling, exploratory drilling, crude-oil and products lines.	
Photo Review of Mississippi Delta Fields of The California Co.	216
Production Problems in Water Area in South Louisiana	222
Agua Dulce First Installation of Fuel Safety System, 2-Cycle Gas Engines	230
Drilling Report: Gulf Coast's Gohlke Field	232
Geological Report, Beauregard and Allen Parishes, Louisiana	240
Gas-Lift Advancements in the Gulf Coast Area	260
Workover Barge Restores 1.3 Million Barrels Crude Per Year	268
Smith Point Field Boasts Unusual Production Facilities	272
Gas Freeing of Tankage, Oil Freeing Waste Water, at Shell's Norco Refinery	279
Secondary Recovery at Kirby Showing Excellent Results	282
Phillips' Bayou Gasoline Plant Recently Placed in Operation	287
Vinyl Coatings Protect Marine Installations from Corrosion	291
New SO_2 Automatic Extraction Unit Installed by Conoco at Lake Charles	313
Progress Report: Gulf Coast's Two-State Phoenix Lake Field	317
Alabama's Geology, and Summary of It's Oil and Gas Development	328
They Don't Take Chances in Rollover Field	343
Prestressed Concrete Pipe Piling in Open Gulf Waters	348
Prestressed Concrete Adapted to Many Structural Uses	351
How Control of Alkylate Quality Affects Aviation-Gasoline Yield	354
Improved Speed-Control Applications at Shell's Houston Refinery	360
Seagoing Cementing Services for Wells in Gulf Waters	368
Persistence by Cities Service Pays Off in Terrebonne Parish, Louisiana	371
Texaco Unveils Its New Deep Drilling Barge	374
New Correlations for Fuel Oil Properties	375
Bammel Storage Project Nearing Completion	376
Louisiana Gas Consumption Up 76 Per Cent; Helped by Transmission Lines	380
Union Producing Co. Revives Old Gas Area in Mississippi	383

STAND OUT

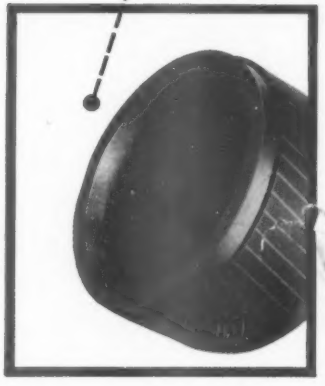
..because it stands up!

Check the advantages of Fairbanks-Morse General Purpose Motors and you'll see why they deliver *stand out* performance . . . *stand up* under the heavy starting loads and long period peak capacity operation of oil field service.

Take the exclusive, one-piece Copperspun Rotor for example and note these advantages:

- ★ A truly one-piece indestructible copper rotor winding.
- ★ Withstands higher temperatures: (melting point 2,000° F. for Copper, 1,100° F. for Aluminum).
- ★ High electrical and thermal conductivity.
- ★ Dense, uniform grain structure.
- ★ Separately mounted fans: permitting complete overall machining, better quality control, better dynamic balance.

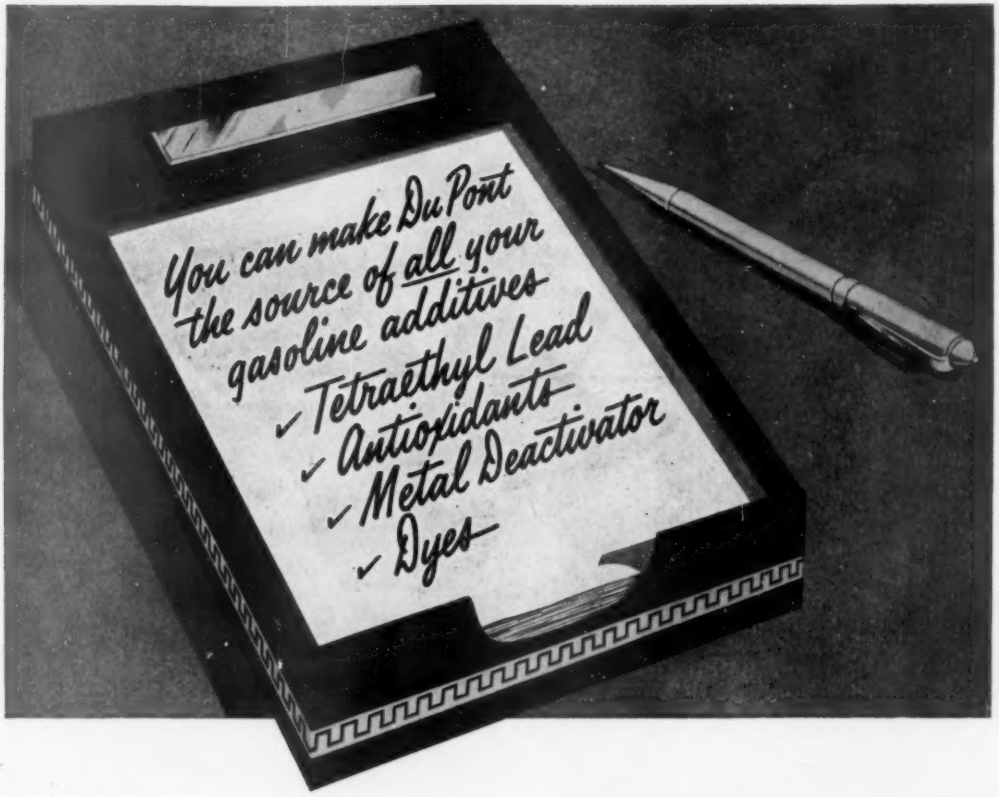
Then consider the unique one-piece cast frame that protects the motor against falling particles and dripping liquids in *any position* . . . the cross-flow ventilation that assures uniform, cool operating temperatures and the many other advantages your supply store will be happy to demonstrate. Easy to see why Fairbanks-Morse should be your choice for *stand out* motor service. Fairbanks, Morse & Co., Chicago 5, Illinois.



FAIRBANKS-MORSE,

a name worth remembering

OIL FIELD EQUIPMENT • PUMPS • SCALES
ELECTRIC MOTORS • GENERATORS • LIGHT PLANTS • DIESEL, DUAL FUEL AND GASOLINE ENGINES • MAGNETOS



Whatever your gasoline additive needs, you can fill them all from one dependable source of supply with uniform, rigidly controlled quality standards.

Du Pont is the only manufacturer of a *complete line* of gasoline additives. Constant research at the Du Pont Petroleum Laboratory aids in improving their quality and increasing their effectiveness.

ECONOMICAL TO USE—In addition to the Petroleum Laboratory, the Du Pont Petroleum Chemicals Division maintains five completely staffed and fully equipped district laboratories to work exclusively on your additive problems. Their work is aimed at helping you gain greater efficiency in the use of additives. And their recommendations may well result in substantially lowering your treating costs.

For the full story on Du Pont gasoline additives and the technical services that go with them, get in touch with the nearest Du Pont Petroleum Chemicals Division district office.

DU PONT
REG. U.S. PAT. OFF.

Better Things for Better Living
. . . through Chemistry

Petroleum Chemicals

E. I. DU PONT DE NEMOURS & COMPANY (INC.)
Petroleum Chemicals Division • Wilmington 98, Delaware

District Offices: New York, N. Y. · Chicago, Ill. · Tulsa, Okla. · Houston, Texas · Los Angeles, Calif.

District Laboratories: Wilmington, Del. · Chicago, Ill. · Tulsa, Okla. · Houston, Texas · El Monte, Calif.

IN CANADA: Canadian Industries Limited—Toronto, Ont.—Montreal, Que.—Calgary, Alta.

"There is a homely adage which runs, 'Speak softly and carry a big stick; you will go far.' If the American nation will speak softly and yet build and keep at a pitch of the highest training a thoroughly efficient navy, the Monroe Doctrine will go far."

—THEODORE ROOSEVELT (1858–1919)

AMERICAN PUMPING UNITS are great for economical, trouble-free oil well pumping. They give longer service with less servicing. Available in many combinations of structure and reducer sizes to meet every pumping requirement. Write for Catalog 151. Contact your favorite supply store or the nearest American office.

AMERICAN
MANUFACTURING COMPANY OF TEXAS
FORT WORTH 1, TEXAS

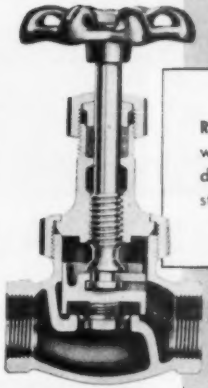
Branch Offices: HOUSTON - KILGORE - ODESSA - TULSA — NEW YORK CITY, 500 Fifth Avenue

UNDERWRITERS' LABORATORIES

UL approved

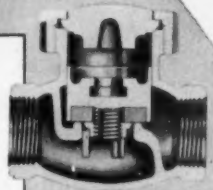
VALVES FOR LP-GAS SERVICE

No. 92LPG Bronze Angle Valve

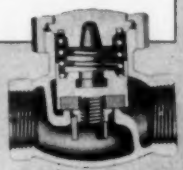


No. 91LPG Bronze Globe Valve

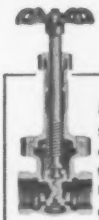
Resilient seat type valves, with synthetic rubber-like discs and specially treated stem packing.



No. 93LPG Bronze Check Valve — Regular

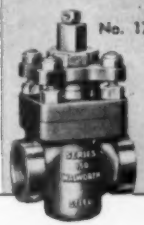


No. 88LPG Bronze Check Valve — Spring Loaded

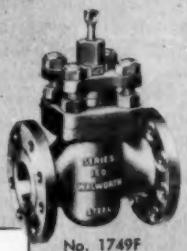


Metal-to-metal taper seat type split wedge gate valve, with specially treated stem packing. Metal-to-metal seat valves are limited by UL to branch or by-pass lines where a positive shut-off is not essential.

No. 29LPG Bronze Gate Valve

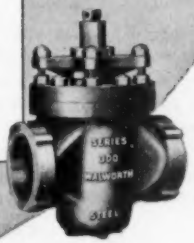


No. 1750

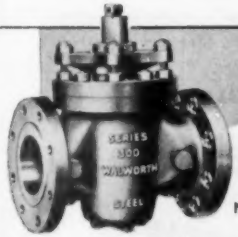


No. 1749F

Steel lubricated plug valves, wrench operated, having screwed or flanged ends and proper lubricant for LP-Gas service.



No. 1760



No. 1760F

Underwriters' Laboratories Pamphlet No. 58 lists requirements for LP-Gas service. Valves are intended for use where working pressures do not exceed 250 psi. — the maximum stop-to-discharge pressure setting of the relief valves on the LP-Gas systems on which they are to be used. This pressure does not necessarily match the manufacturers WOG rating. The Walworth valves illustrated here meet the UL requirements within the set limits. Your local distributor will be glad to furnish complete information, or write to:

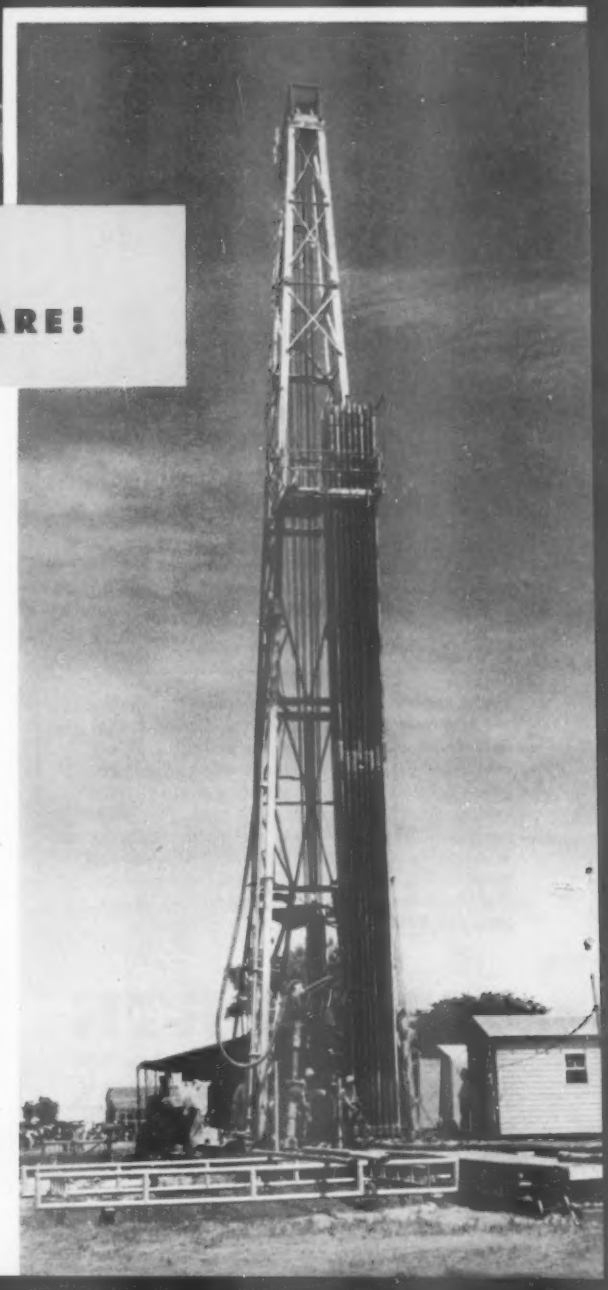
WALWORTH

valves • fittings • pipe wrenches

60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

The Oil and Gas Journal, published Mondays, copyright 1952, by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910, at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $4 yearly.



FAST ROUND TRIPS WITH POWER TO SPARE!

Three "Caterpillar" D13000 Oilfield Engines are compounded to power the draw works and mud pump of J. D. Ferrell's operation in Thomas County, Kansas. Drill stem testing at 4,000 feet, it takes about an hour to come out of the hole and 1½ hours to go back in. The "Caterpillar" team furnishes steady power—and plenty of it!

In addition to these D13000s, Mr. Ferrell has three more on another rig. He finds that it pays to standardize on "Cat" Oilfield Engines. All equipment is interchangeable. And the engines are so rugged they deliver power day after day with a minimum of attention.

Rugged as they are, "Caterpillar" Oilfield Engines will do an even better job for you if treated right. And that doesn't mean you have to pamper 'em. Just give them a few minutes' proper maintenance a day and you'll add *extra* hours to their working life. Your "Caterpillar" Dealer is nearby to help, too. Wherever you are, you can count on him for fast, efficient service!

CATERPILLAR, PEORIA, ILLINOIS

CATERPILLAR

REG. U. S. PAT. OFF.

Oilfield Engines

BACK ON PRODUCTION
HOURS SOONER WITH

HALLIBURTON'S
RETRIEVABLE CEMENTER

You want *speed* on a remedial squeeze job, completed successfully with a big saving of rigtime. That's the job for Halliburton's Retrievable Cementer.

ITS ADVANTAGES ARE MANY! In just one trip you can spot squeeze any number of prelocated points, or test pipe at as many places as necessary to locate leaks. No surfacing between jobs. The Halliburton Retrievable Cementer can be run in on drill pipe or tubing, and ordinarily is *out of the hole within an hour after cement is placed!* You eliminate the waiting time required for cement to set and the drilling time necessary when drillable packers are used.

PRECISION BUILT FOR TROUBLE-FREE PERFORMANCE. Halliburton's 25 years research and million-job experience have gone into the simple construction and efficient operation of this versatile tool. An equalizing valve assures rapid lowering of the casing. A safety joint disengages the circulating valve and tubing or drill pipe should inferior casing cause fouling. The slip body itself, with fully automatic features, is ruggedly built to withstand 8,000 to 10,000 p.s.i. under squeeze cementing operations.

Let Halliburton show you how fast, accurate, and economical squeeze cementing can be with the tool proved successful all over the world. Phone your nearby Halliburton representative for complete information. Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

YEARS AHEAD IN SQUEEZE CEMENTING!

HALLIBURTON

DOUBLE BARREL PROTECTION

To insure complete protection against production difficulties due to problems of emulsification or corrosion, ask your Tretolite field engineer about Tret-O-Lite and Kontol. These two quality products, backed by years of Tretolite Company field experience, provide assured protection against two production problems that often are annoying and costly.

DEHYDRATING · CORROSION INHIBITING

DESALTING · SCALE PREVENTING · PARAFFIN REMOVING · WATER DE-OILING

TK52-6

8 TIMES the service

HANDLING REFINERY STEAM

ORDINARY hose used to handle 125 lb. working steam pressures in this refinery —occasionally in 24-hour service—failed after approximately 2 months.

G.T.M.—Goodyear Technical Man—recommended using Goodyear HD GLASS CORD STEAM HOSE. It served 17 months—proof that Goodyear job-design means longer hose service at lower over-all cost.

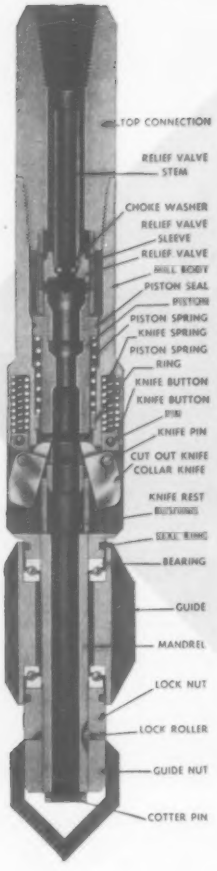
GOODYEAR INDUSTRIAL RUBBER PRODUCTS
GR-Specified HD GLASS CORD HOSE
for general refinery steam service
A
B
C
A Heavy-gauge, heat resistant tube remains soft and flexible at temperatures up to 388°
B Glass cord, "flexible-braided" body is noncharring; handles pressures up to 200 lbs. psi.
C Tough, sturdy cover provides maximum protection

LOOK FOR YOUR GOODYEAR INDUSTRIAL RUBBER PRODUCTS DISTRIBUTOR *in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods." He handles Hose, Flat Belts, V-Belts, Molded Goods, Packing, Tank Lining, Rubber-Covered Rolls built to the world's highest standard of quality.*

GOODYEAR

THE GREATEST NAME IN RUBBER

The NEW A-1



Autoflex-Eccentric Guide Casing Mill

increases milling rate 263%* over conventional casing mills!

* Figure based on average milling of N-80 and J-55 grade casings with A-1 Autoflex-Eccentric Guide mill from October, 1951, to May, 1952, as compared to conventional mill's average from January, 1949, to August, 1949.

Three New Features Increase Speed and Efficiency:

Heavier Knives: New design permits use of thicker, longer knives for *more cutting power* and *longer life.*

Plane Action: Each of 5 knives is individually *spring-loaded* to plane down against the milling surface regardless of the amount of oscillation of the tool.

Sawing Action: A swiveled guide causes the path of knife rotation to be off center. Thus instead of wearing a groove in the knife's cutting surface, each knife is made to saw, using *full* cutting surface.

Write for Details Today

A-1 BIT & TOOL COMPANY

2000 HUSSION STREET • BOX 2133 • CHarter 7611 • HOUSTON

DISTRICT OFFICES AND SERVICE POINTS:

TEXAS
Beaumont
Corpus Christi
Kilgore
Midland
Victoria

CALIFORNIA
Los Angeles
Baash-Ross Tool Co.

LOUISIANA
Houma
Lafayette
Lake Charles
New Orleans

MISSISSIPPI
Brookhaven

OKLAHOMA
Duncan
Oklahoma City

WYOMING
Casper
W. A. Posey
(Sure-Shot)
Baash-Ross Tool Co.
(Sidewall Cores, Milling, Side Tracking, and Burris Key Seat Wiper)

ILLINOIS
Olney
Baash-Ross Tool Co.

CANADA
Calgary and Edmonton
Import Tool Co.

EXPORT REPRESENTATIVES:

SOUTH AMERICA:
C. R. Summers,
Avila Hotel,
Caracas,
Venezuela

NEW YORK, N. Y.
Beckley, Haltom & Hickman
30 Rockefeller Plaza

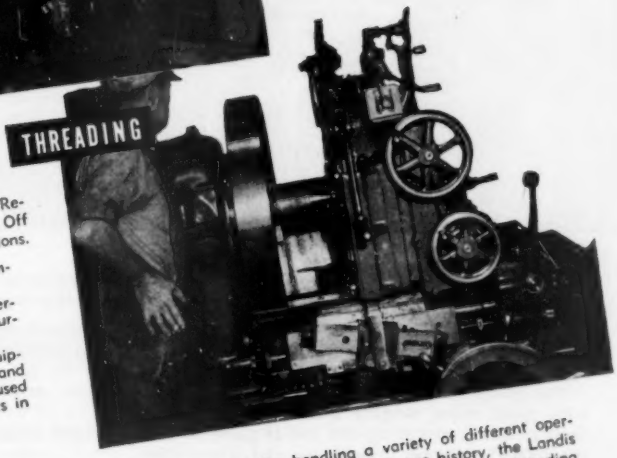
ARGENTINA:
Langley y Cia.
Corrientes 1115
Buenos Aires

NEAR & FAR EAST
W. O. Calvert
20 Copthall Ave.
London E. C. 2
England

MEXICO
J. E. Douglas
2nd Natl. Bank Bldg.
Houston, Texas

More Jobs Per Dollar Invested

LANDIS PIPE MACHINES do many operations for this Texas Company...



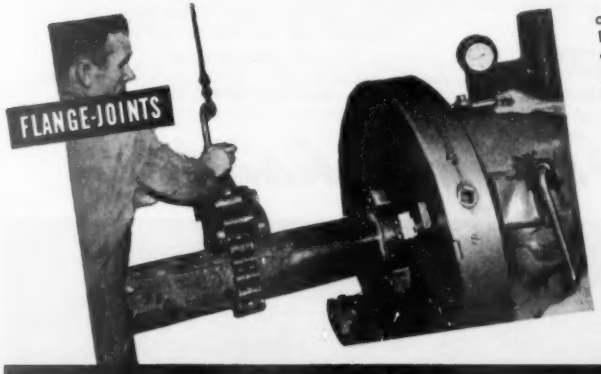
. . . . . saving handling, saving labor, saving machines . . . resulting in dollars saved and dollars earned for this production plant.

Illustrations show the **same** 13⅜" Landis Receding Chaser Pipe Threading and Cutting Off Machine performing three **different** operations.

CUTTING OFF—Casing is cut off, chamfered and then reamed.

THREADING—7" casing to A.P.I. tolerances, using a cutting speed of 18 surface feet per minute.

FLANGE MAKE-UP—Rear chuck is equipped with grip for making up joints and both the front and rear chucks are used for breaking casing or drill pipe joints in oil field work.



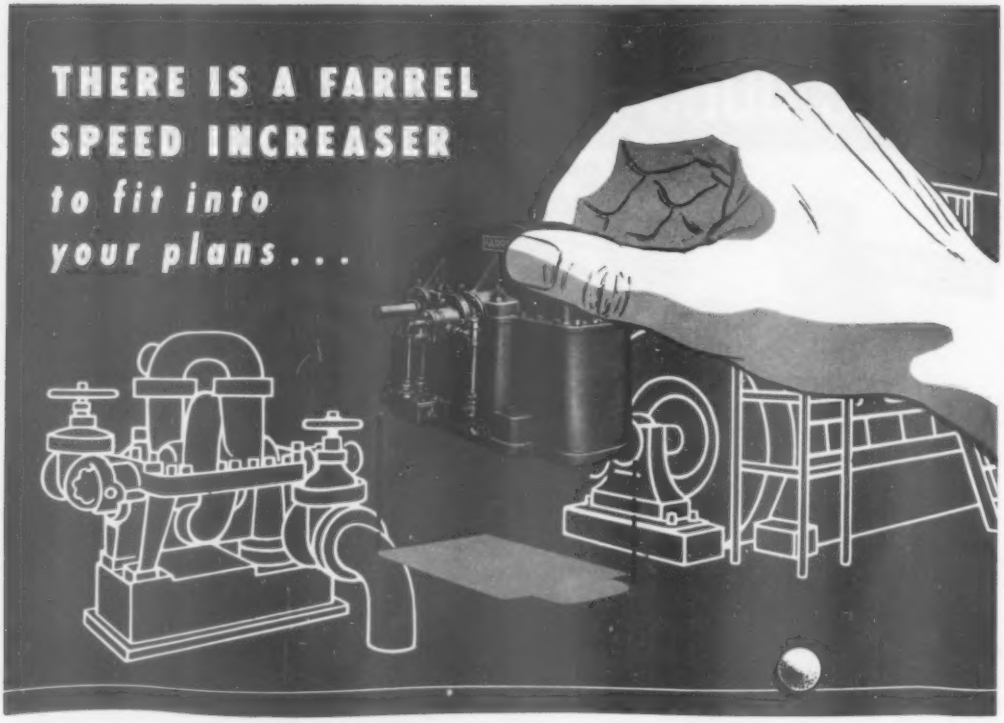
Besides handling a variety of different operations, as shown in this case history, the Landis Pipe Machines offer great versatility in threading operations alone. Each size machine handles a wide range of thread diameters. Within this range, and using the same set of chasers, the machine will cut threads of all diameters having the same taper, pitch and form. In addition, these machines are designed to cut tapered threads to precision tolerances. Accurate taper is assured by the sine bar feature, which causes the chasers to be withdrawn at a rate directly equal to the thread being produced.

Landis Pipe Threading Equipment can widen the gap between costs and selling prices in your plant. For complete details and specifications of Landis Pipe Threading Machines and Landis Tangential Chasers, write for Bulletin #C-77.

LANDIS *Machine* COMPANY · WAYNESBORO PENNSYLVANIA

Represented in the *Domestic Oil Fields* by: Colcord-Wright Machinery & Supply Co., St. Louis, Mo.; C. J. Harter Machinery, Houston, Texas; Frederic-Baker Co., New Orleans, La.; Moore Machinery Co., Los Angeles and San Francisco, Calif.; Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

THERE IS A FARREL SPEED INCREASER *to fit into your plans . . .*



Farrel Type SI units were the first speed increasers to be developed in a standard series for pipeline pumping service. That was twenty years ago, and all of the original units, as well as those installed since, are still in operation.

The modern SI line consists of 49 standard sizes with speed ratios ranging from 1:1 to 12:1. For higher ratios, units using two sets of gears are supplied with ratio range from 12:1 to 40:1. Two-pinion units, designed to transmit power from a single engine to two pumps are also available.

When requirements fall between the range of Type SI units and standard commercial speed reducers, Farrel semi-high speed units are recommended.

These units are designed for pinion speeds up to 3600 RPM and gear pitch line velocities up to 4000 FPM.

Farrel engineers will be glad to help you select the right gear unit for your high-speed application. Write for further information about any of the types mentioned.

FARREL-BIRMINGHAM COMPANY, INC. • ANSONIA, CONN.

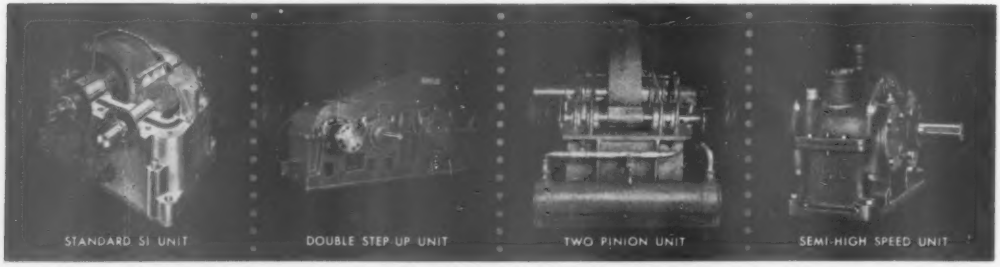
Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Boston, Pittsburgh, Akron, Detroit, Chicago, Minneapolis, Portland (Oregon), Los Angeles, Salt Lake City, New Orleans

OIL FIELD REPRESENTATIVES:

Hercules-Lupfer Engine Sales Co., 124 N. Boston St., Tulsa 1, Okla.
V. W. Osborne, 860-A M&M Building, Houston 2, Texas

Farrel-Birmingham®

FB-747



For
WELL HEAD
PROTECTION
use

GROVE

MODEL 390

SPECIFICATIONS:

- Controls well pressures up to 6000 psi.
- Maximum overpressure setting — 5000 psi.
- Maximum underpressure setting — 4000 psi.
- Overpressure, underpressure, or pilot-operated combination units.
- Angle or in-line design.
- Screwed or flanged connections.

If well flow lines should fracture or freeze . . . if other equipment should fail—will you be ready? For any well head emergency, Grove Model 390 Protection Systems automatically stop the flow—dead tight! They operate as often as required—many times a day, or once in a lifetime. Overpressure or underpressure settings are easily made or changed in the field. Resetting can be manual or automatic.

Model 390 main and pilot valves utilize the patented Grove Dome-loaded Diaphragm-operated principle. Pressure range is universal. Loading is quick and accurate. Elimination of springs, pistons and stuffing boxes assures a tight seal with no chance of corrosion or sticking.

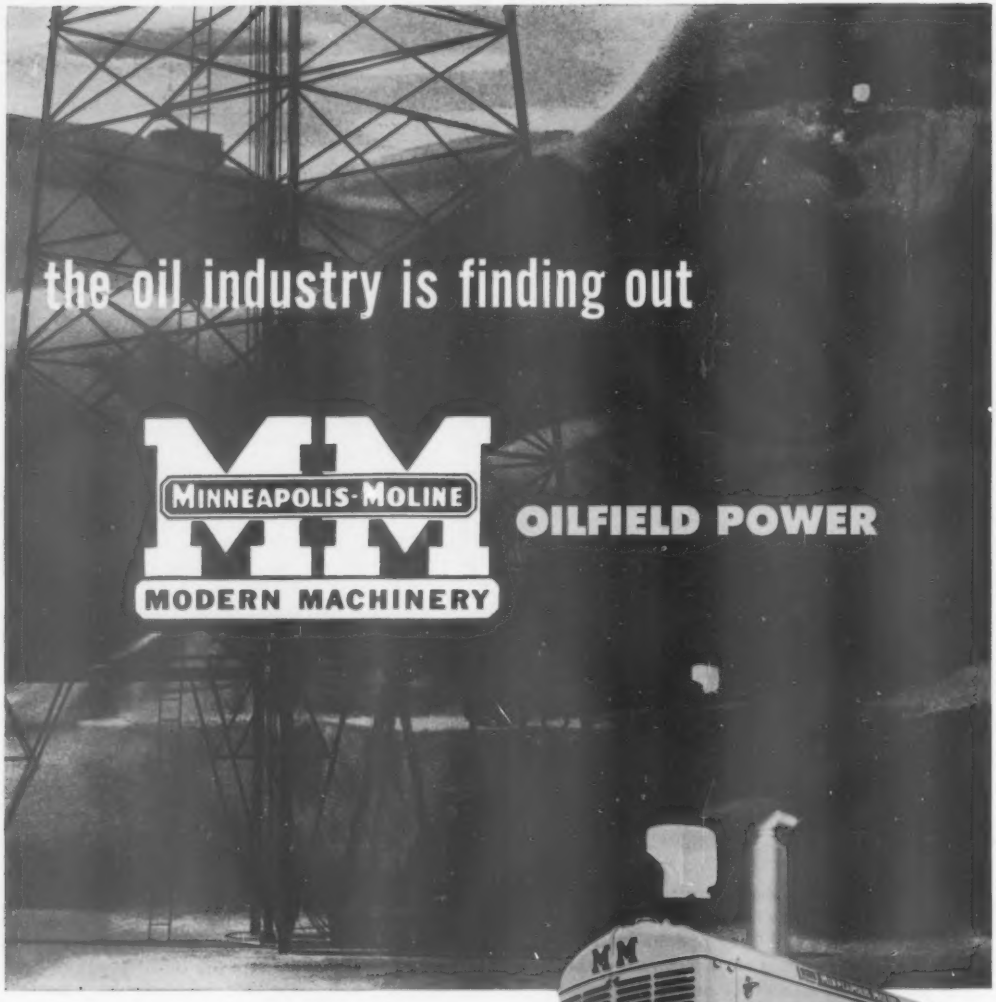
Grove automatic Well Head Protection Systems offer the safest, surest emergency shut-off control available. Wire or write today for detailed technical information.

GROVE

The reliability of Grove Valves and Regulators is proved by the thousands of successful installations handling air, gas, oil, water and other fluids. For the solution to your control problems, contact the nearest Grove representative.

MODEL 390 WELL HEAD PROTECTION SYSTEMS

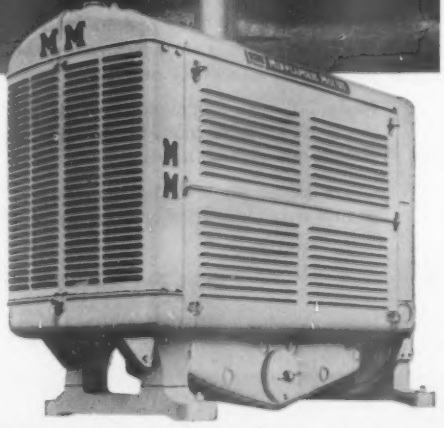
GROVE REGULATOR CO. [illegible] 1801 CALUMET, HOUSTON 4, TEX. • 415 LEXINGTON AVE., NEW YORK 17, N. Y.



A multicylinder gas engine, properly designed, can operate 24 hours a day, month after month, without stopping—10 years without overhaul. Such is the performance of MM Oil Field Engines.

These engines have been specially designed for this job. Superior methods of filtration cleanse the air, fuel, lube oil and crankcase vapors. Exclusive MM water jacketed base pan with filter cartridge mounted inside, maintaining a 190° constant lube oil temperature, eliminates sludge formation which in ordinary engines combines with dirt and grit to destroy moving parts. Heavy fine grain engine castings easily take severe shocks and strains imposed by oilfield loadings.

Thousands of these engines are operating for satisfied customers in oilfields throughout the world.



MINNEAPOLIS-MOLINE
MINNEAPOLIS 1, MINNESOTA

distributed by **SHRIMPTON** MANUFACTURING AND SUPPLY CO.
LOS ANGELES • OKLAHOMA CITY • KILGORE

Canadian Distributor: Disher Winslow Ltd., Edmonton, Alta.

The Petroleum Industry

STOPS RUST!

with

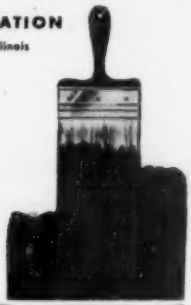
RUST-OLEUM

The Practical Way to Save Pipes, Tanks, Derricks, Buildings, Pumps, Roofs, Fences

Ask the maintenance men who battle rust daily! They'll tell you that RUST-OLEUM is the practical answer. (1) It may be applied directly over surfaces *already rusted* without removing all the rust. Wirebrushing and scraping with sharp scrapers to remove rust scale and loose particles is all that is usually required... eliminating costly sandblasting and chemical pre-cleaning... often enabling one man to do the work of two. (2) RUST-OLEUM *beautifies as it protects in all colors, aluminum, and white.* (3) RUST-OLEUM *stops rust* on every rustable metal surface indoors and out.

See how RUST-OLEUM can cut your maintenance costs. Prompt delivery from Industrial Distributor stocks in principal cities in the United States and Canada.

RUST-OLEUM CORPORATION
2542 Oakton Street • Evanston, Illinois

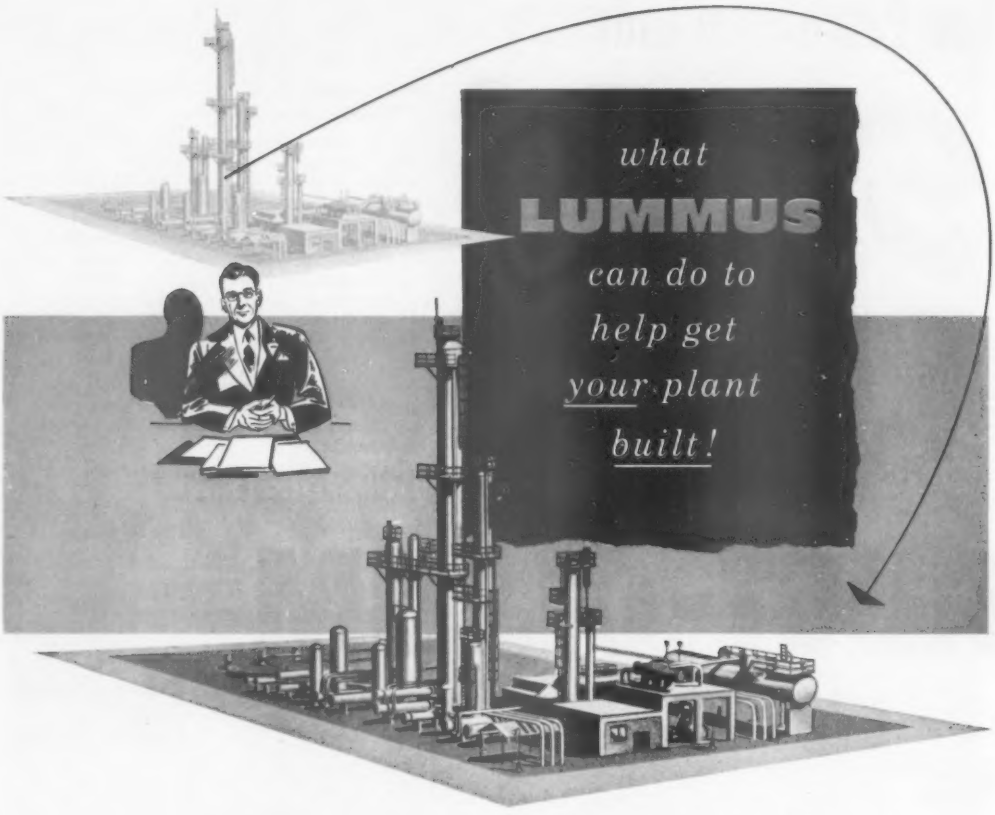


May be applied directly over rusted surfaces without removing all the rust!

Available in All Colors, Aluminum and White

CLIP THIS TO YOUR LETTERHEAD
MAIL TO: RUST-OLEUM CORPORATION
2542 Oakton Street • Evanston, Illinois

- ☐ Have a Qualified Representative Call
- ☐ Full Details on Free Survey
- ☐ Complete Literature
- ☐ Nearest RUST-OLEUM Source



Design, engineer and construct it? Of course. These three main classes of service—performed under *one* contract with *single* responsibility—are our bread and butter. They have produced more than 600 plants of all types in just about every country where petroleum is refined or chemicals are made.

Today's conditions, however, call for departures from "routine." Otherwise, endless complexities, shortages, etc., could require three times the normal effort to get a plant built. But Lummus has the quality and versatility of staff—the breadth and depth of operations, to meet these conditions head-on and help you maintain near-normal status.

It could work like this. In the interest of "first things first," you may need basic studies and reports covering alternative routes for reaching your goal. If so, rely on Lummus to develop analyses on which to base sound capital investment decisions.

Perhaps your problem is not so much with process units themselves, but with tying the whole system together for full operating efficiency. Lummus has long-established experience in laying out and installing complete off-site facilities—the bringing in of utilities—piping to introduce charge materials and carry off products—tankage, dockage, loading facilities, etc. This is "know-how" you can use to advantage.

Among other added factors are the considerable help we afford in procuring materials, and invaluable counsel in interpreting government rules and regulations—all in all, unique services geared to the times.

We invite you to use our various services, either singly or in combination—to get that plant *built!*

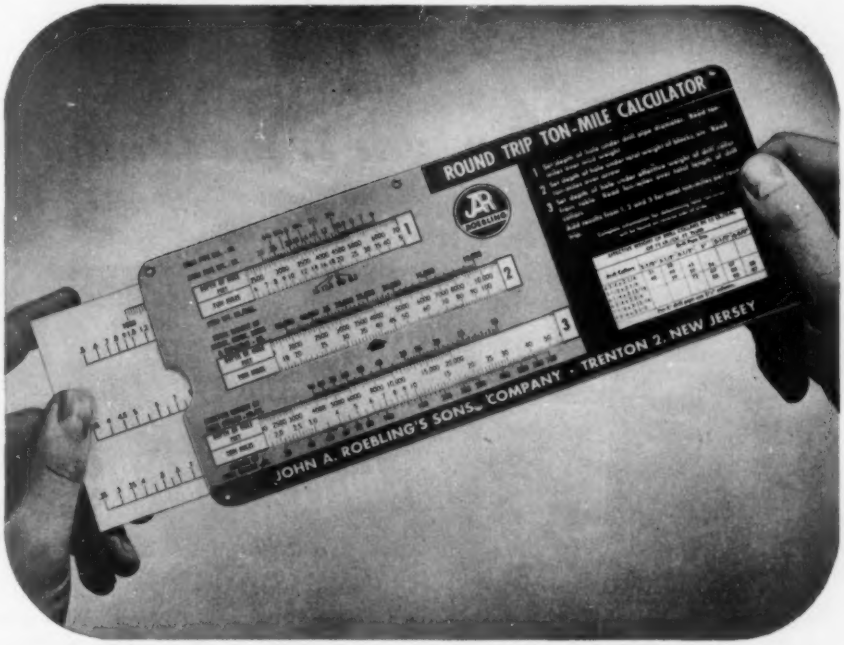
THE LUMMUS COMPANY

385 MADISON AVENUE, NEW YORK 17, N. Y.

HOUSTON • CHICAGO • LONDON • PARIS • CARACAS

DESIGNING ENGINEERS AND CONSTRUCTORS FOR THE PETROLEUM AND CHEMICAL INDUSTRIES

TON-MILE CALCULATOR



Now, in seconds, you can figure your ton-miles with the new Roebling Calculator!

1, 2, 3 SETTINGS and simple addition give you an accurate ton-mile reading with the Roebling Round Trip Ton-Mile Calculator. It uses a complete range of hole depths, pipe diameters, mud weights, etc. It's sturdy and just the right size for your pocket, too.

It's offered to you by the makers of Roebling "Blue Center" Steel Wire Rope . . . the rope that saves you time and cuts your costs because it stands up when the going gets tough.

Call in your Roebling Field Man for the right rope for top service. District offices at Cleveland, Denver, Houston, Los Angeles, Odessa and Tulsa. And write us for your Round Trip Ton-Mile Calculator. John A. Roebling's Sons Company, Trenton 2, N. J.

ROEBLING

DISTRIBUTED BY

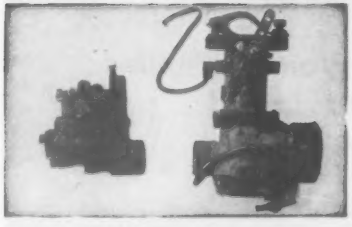
THE NATIONAL SUPPLY COMPANY

REPUBLIC SUPPLY COMPANY

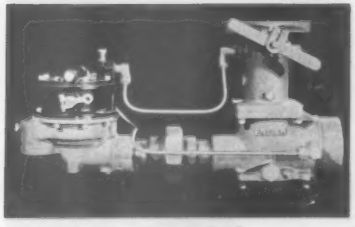
How to make 'em Last Longer

Ensign parts available for all Early Models of Gas Carburetors and Regulators

Before



After



When requesting ENSIGN Service Bulletins, please specify make and model of engine on which carburetor is installed. Also, fuels used.

In keeping with the CONSERVATION order of the day, here's how you can stretch out the useful life of your carburetor equipment.

1. Keep air cleaner to carburetor connections tight. A dust leak wears out carburetor shafts, bushings, and engines.
2. Check engines for loose mounting bolts. Vibration causes excessive wear on all parts and accessories.
3. Replace any worn carburetor and regulator parts; diaphragms, shafts, valves, seats, gaskets, etc.
4. Request ENSIGN Service Bulletins covering the ENSIGN equipment on your engine.

ENSIGN Carburetors are built to out-last the engines on which they are installed. A reasonable amount of preventative maintenance will help both carburetor and engine to render long uninterrupted service.

ENSIGN
CARBURETOR COMPANY

7010 South Alameda St., Huntington Park, Calif. • 2330 West 58th St., Chicago 36, Illinois

Coasting is fine for him—but not for us

A good friend of ours asked us not so long ago, "Why does Ethyl keep up all this activity—research, advertising, educational shows, exhibits, customer services of all kinds? Why not just make your product and sell it?"

The answer is very simple. The U. S. petroleum industry is a progressive, up-hill business and a very competitive one.

That industry buys "Ethyl" antiknock compound from us and adds it to their gasoline. Furthermore, they change and improve their gasoline from year to year. To be prepared for those changes—and to be sure that refiners get the most from every cc of "Ethyl" antiknock compound, we must be continually exploring ahead.

(*Continued on next page*)

Coasting is fine for him—but not for us

(Continued from preceding page)

At the same time, engines, lubricating oils and operating conditions are changing—so we try to be ready with the answers to the various technical problems that arise.

And since gasoline containing "Ethyl" fluid must ultimately be sold to consumers, we aim to keep out in front with up-to-the-minute merchandising and advertising help for our customers in all parts of the country.

We regard ourselves as part of the petroleum business, and that makes us part of your business. The petroleum industry has never coasted. It has always pushed on to greater and greater accomplishments. And you can be sure that Ethyl people will always be ready and anxious to do their share of the pushing.

ETHYL CORPORATION

NEW YORK 17, NEW YORK

Ethyl service is backed by 29 years of antiknock experience

RESEARCH

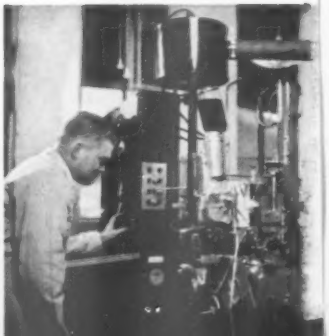
SUPPLY SERVICE

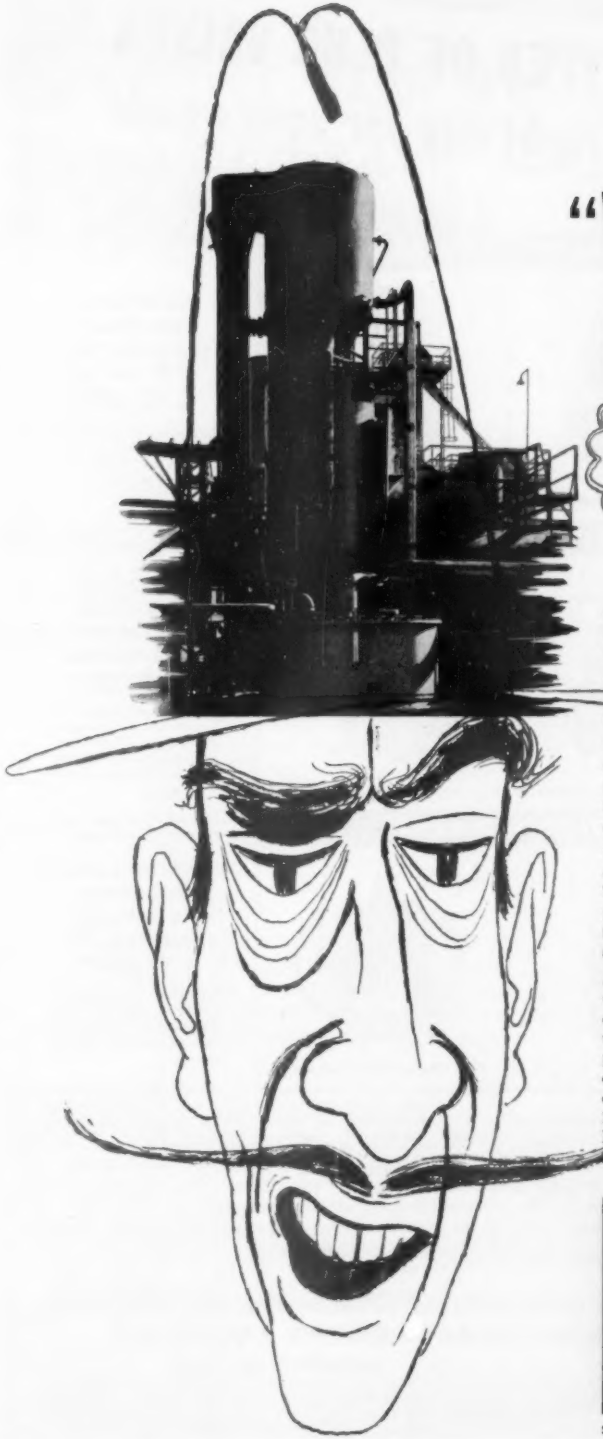
TECHNICAL NOTES

SALES HELPS

ROAD TESTING

GASOLINE TESTING





"Villain" becomes hero

The "villain," refinery waste, may be costing you money in the expense of disposal. He may be costing you community goodwill because of air and stream pollution. If so, it's time to look into the Monsanto-Ross-Wilde sludge-recovery unit.

With the Monsanto-Ross-Wilde unit, you can change the "villain" into a hero . . . change an expense into profit . . . eliminate freight costs for the transportation of fresh acid and sludge.

The Monsanto-Ross-Wilde unit makes clean, white sulfuric acid of any desired strength from refinery sludge, from H_2S or from both together. The unit can be tied in with your sulfuric acid plant, or, if you have no plant, Monsanto will furnish designs for sludge-recovery and sulfuric-acid units as one project.

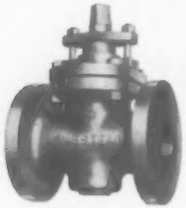
At your request, a Monsanto representative will call at your refinery and estimate the cost of installing a Monsanto-Ross-Wilde unit. He will show you how much sulfuric acid you can produce . . . how much you can save on disposal costs. His services are yours without cost or obligation. Write, wire or phone MONSANTO CHEMICAL COMPANY, Engineering Sales Department, 1700 South Second Street, St. Louis 4, Missouri.

MONSANTO
CHEMICALS – PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

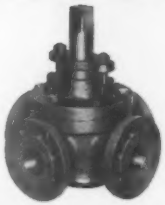
WE MAKE *ALL* TYPES OF PLUG VALVES
. . . including the *right* one for *your* needs

HOMESTEAD CAM-SEALD



Straight-way—
Flanged or Screw Ends

Three-way—Screw or Flanged Ends

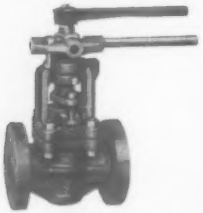


Four-way—Flanged or Screw Ends

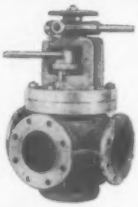
HOMESTEAD CAM-SEALD, QUARTER-TURN PLUG VALVES
(non-lubricated, or pressure-gun lubricated, as desired)

Available in metals for most valve needs; for pressures to 3,000 lbs.; temperatures to 750° F.

HOMESTEAD LEVER-SEALD



Straight-way—
Flanged or Screw Ends



Three-way—Flanged or Screw Ends

Four-way—Flanged or Screw Ends

HOMESTEAD LEVER-SEALD, QUARTER-TURN PLUG VALVES
(non-lubricated, or pressure-gun lubricated, as desired)

Made in combinations of metals and alloys to meet practically any service requirement; from 1½" to 10"; from vacuum to 1,500 pounds.

HOMESTEAD-REISER

Straight-way—
Screw or Flanged Ends

Straight-way—
Worm & Gear Operated

Flow-Changer—Non-lubricated

HOMESTEAD-REISER SELF-SEALD LUBRICATED PLUG VALVES
(100% Port Area, or Venturi, as desired)

Available in semi-steel; cast steel; sizes ½" to 12" for steam pressures to 150 lbs.; oil-water-gas to 200 pounds.

We are the only manufacturer who makes *all* of the various types of plug valves used in industry . . . LUBRICATED . . . NON-LUBRICATED . . . FULL PORT . . . VENTURI. We have no "leaders." *We make them all;* therefore, we have no reason to "push" one type valve over another. Our only concern is to see that you get the *right* valve for *your* requirement.

To help you keep this in mind the next time you need plug valves, we'd like to send you our catalog. Why not write for it today.

HOMESTEAD VALVE MANUFACTURING COMPANY
P. O. BOX 403 **CORAOPOLIS, PA.**

Serving since 1892

Another Sign of Gulf Coast DEVELOPMENT

This sign marks supply stores all along the Gulf Coast and north into Canada. Eighty-seven in all.

This sign to a Jones & Laughlin Supply Company customer means exactly what it says . . . here's MY warehouse! A spot where I feel at home. A place where I can get anything I need without being urged to buy something I don't want. People I like. My warehouse!

We invite you to take advantage of this sign of development in supply store merchandising . . . this conviction that good merchandise, good service, and good fellowship are what the industry needs and wants and appreciates.

AMERICA NEEDS SCRAP TO MAKE MORE STEEL

Jones & Laughlin Supply Company

"...here's MY warehouse!"

EXPORT: 405 Lexington Ave., New York, N. Y., U. S. A.

87 STORES • 18 OFFICES • 9 RESIDENT SALESMEN

General Offices: TULSA, OKLAHOMA

J&L STEEL

Subsidiary of Jones & Laughlin Steel Corporation

Bucyrus-Erie Spudders Set The Pace in

MULTI-JOB VERSATILITY

THE combination of features built into Bucyrus-Erie spudders equip these rigs to take on all jobs, right down the line—top-to-bottom drilling, tailing-in, cleaning-out, swabbing, deepening, tubing-and-rod servicing, fishing, seismograph prospecting.

They're hard hitting for rapid hole footage . . . fast hoisting for quick handling of tools, bailer, casing, tubing and rods . . . highly portable and easy to rig for maximum drilling time. And with two forward speeds and instantaneous reverse on all drums through interconnecting friction clutches, they provide the split-second control that diversified operations require.

Versatility teams up with a string of other pace-setting Bucyrus-Erie spudder advantages. Ask for details about 24-L, 28-L, 36-L, 48-L.

BUCYRUS-ERIE COMPANY, South Milwaukee, Wisconsin

These Bucyrus-Erie distributors are at your call

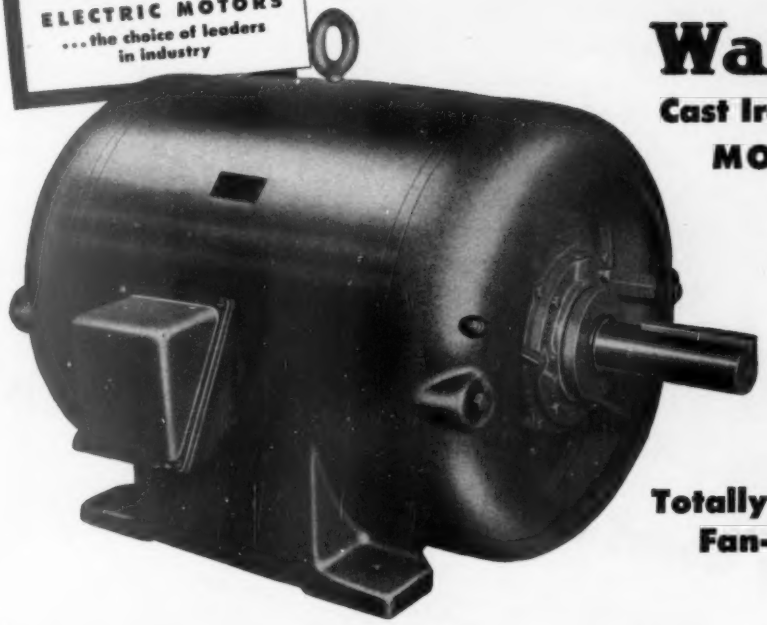
Beacon Supply Co.	Borger and Pampa, Texas
Beckwith Machinery Co.	Bradford and Pittsburgh, Pa.
Buckeye Supply Co.	Wooster and Zanesville, Ohio; Chase and El Dorado, Kansas
Drillers Supply Co.	Joplin, Mo.
Drilling & Mining Equipment Co.	Los Angeles 21, Calif.
Great Northern Tool & Supply Co.	Billings, Cut Bank and Kevin, Mont.; Casper, Wyo.
Iverson Supply Co.	Oklahoma City, Okmulgee and Tulsa, Okla.; Ft. Worth, Kermit, Midland, Odessa, and Snyder, Texas; Artesia and Farmington, N. M.
Lucey Export Ltd.	Calgary and Edmonton, Alta.
The McJunkin Corporation	Charleston, W. Va.; Allen, Ky.
Olympic Supply Co.	Seattle, Wash.
Randall-Zagg Supply Co.	Princeton, Ind.
The Straker Supply	Mt. Pleasant, Mich.
Tillsonburg Pipe & Supply Co.	Tillsonburg, Ont.

133552

BUCYRUS ERIE

FIRST with the FINEST in Spudders

Wagner
ELECTRIC MOTORS
...the choice of leaders in industry



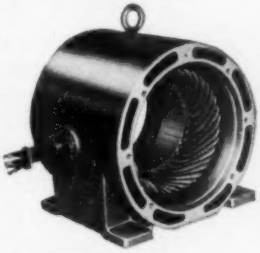
Wagner
Cast Iron Frame MOTORS

Totally-enclosed Fan-cooled

Built for use in corrosive atmospheres

Wagner Cast Iron Frame Motors are designed to provide the corrosion resistance demanded by applications in chemical plants or in other applications where protection against corrosion is required. They feature completely protected laminations . . . special varnish treated windings . . . a cast iron, gasket-sealed conduit box . . . a running shaft seal . . . and are totally-enclosed and fan-cooled for complete protection against acids and alkalies present in the atmosphere in the form of dust, fumes or moisture. The photo at right illustrates the rugged, one piece cast iron frame, showing openings for ventilation.

Where additional protection against explosive atmospheres is desired, an explosion-proof design (type JP) is available. Both the standard (type EP) and the explosion-proof types are built in ratings from 2 to 250 hp., with either normal or high torque characteristics. Non-ventilated 1 and 1½ hp. motors also available. Wagner Bulletin MU-132 gives complete information on these corrosion-resistant motors. Write for your copy today.



WAGNER ELECTRIC CORPORATION
6389 Plymouth Ave., St. Louis 14, Mo., U.S.A.

®Wagner Electric Corporation
EST. 1891

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

BRANCHES IN 32 PRINCIPAL CITIES

M52-10

For worms and gears—in standard sets or to special requirements—or as worm-gear speed reducers, including the economical fan-cooled Speedaire unit—you can always depend on Cleveland.

High quality worms and gears to meet your needs

● You pay no more for Cleveland worms and gears—and yet, built into them are extra years of service and satisfaction

Uniform, high quality has been an outstanding characteristic of Clevelands through 40 years—a generation devoted to the manufacture of fine worms and gears exclusively. Specifically, there are four ingredients of Cleveland quality:

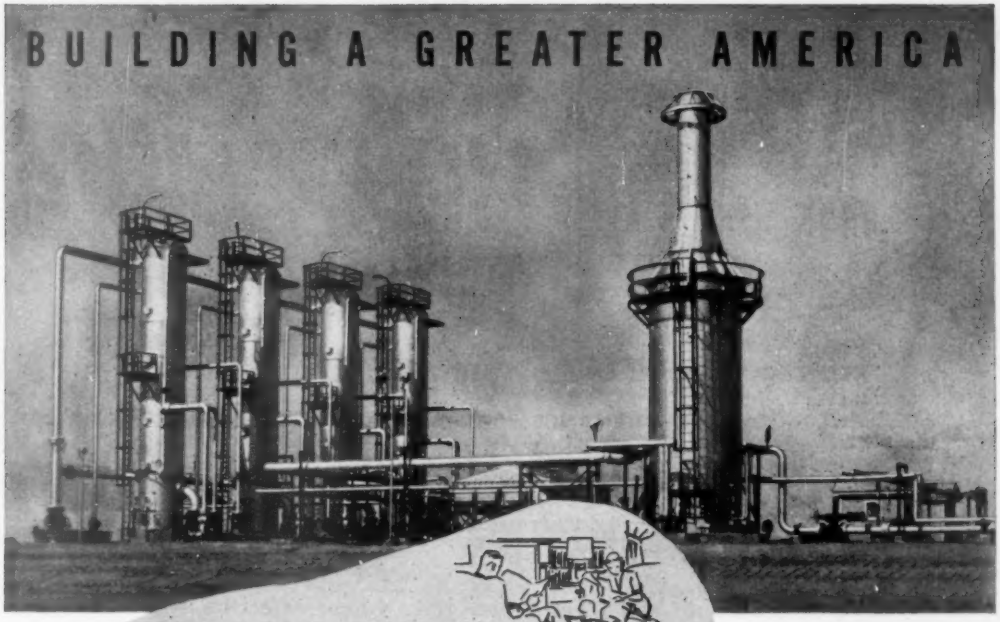
1. Correctness of design—design proved best by years of performance.
2. The finest of materials, selected after years of experience and research.
3. Modern machine tool equipment, in a modern plant kept up-to-date by a policy of continuous replacement.
4. Machinists and other production workers who are craftsmen, trained in precision work.

So whatever your need, consult Cleveland. Sales representatives in all major industrial centers are at your service, to help you select correct types and sizes and discuss any phase of your power transmission problems.

Write for the latest Cleveland catalog, indicating your requirements. The Cleveland Worm & Gear Company, 3286 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

BUILDING A GREATER AMERICA



Built at Sun Ship, on the Delaware, these dehydrating towers now serve Western homes and industries.

Across the wide Missouri

Pioneers in prairie schooners blazed a courageous trail "across the wide Missouri . . ." and across the entire continent . . . in their search for new opportunity.

The industrial services of modern America have followed in that trail. Thriving farms, towns and cities mark sites where pioneers found only hardship . . . because American industry is truly "All-American."

Today, *all* America shares the benefits of *all* of America's progress . . . because great companies develop and distribute the advantages latent in our natural resources . . . and because great industries like Sun Ship can build and deliver, anywhere in the world, the gigantic equipment needed to convert petroleum and various chemicals into light, heat, power and the other productive forces which serve mankind's comfort and progress.

Sun

SHIPBUILDING & DRY DOCK COMPANY

SINCE 1916

ON THE DELAWARE • CHESTER, PA.

25 BROADWAY • NEW YORK CITY

NEW DU PONT 80% CMU WEED KILLER

KEEPS GROUND BARE OF ALL VEGETATION . . . OUTSTANDING TO PREVENT FIRE AND MAINTENANCE HAZARDS IN OUTDOOR INSTALLATIONS

Now Du Pont CMU Weed Killer gives you an effective, economical new control for grass and weeds. One application of CMU keeps ground bare of vegetation for as long as a year!

This new weed killer is absorbed through the roots of plants, and kills all growth above and below ground. Tests throughout the United States and Canada indicate it gives long-lasting, economical control of many types of vegetation to prevent fire and other hazards around outdoor installations.

Du Pont CMU has other advantages, too. It is non-volatile, non-flammable and non-corrosive. In fact, it promises new efficiency in weed control wherever you want to keep the ground bare: around substations, power plants, pole yards, etc.

Get this free leaflet *giving further details on Du Pont 80% CMU Weed Killer. For full information on CMU, "Ammate" and other Du Pont weed and brush killers, write Du Pont, Grasselli Chemicals Dept., 5031 Du Pont Bldg., Wilmington, Del.*

On Rights-Of-Way

AMMATE® KEEPS BRUSH DOWN WITH FEWER SPRAYS

For lower-cost brush control, "Ammate" Weed Killer is ideal. Many users report "Ammate" sprays once every five years control brush along with their rights-of-way. Thus it is possible for maintenance crews to cover more ground more economically. "Ammate" does not leave soil unproductive, so grass and low growth come back to control erosion. It's non-flammable, non-volatile. For further details, write to Du Pont.

* * *

DU PONT CHEMICALS FOR THE FARM INCLUDE: *Fungicides:* PARZATE® (Liquid and Dry), FERMATE,® ZERLATE,® Copper-A (Fixed Copper), SULFORON® and SULFORON®-X Wettable Sulfurs . . . *Insecticides:* DEENATE® DDT, MARLATE® Methoxychlor, LEXONE® Benzene Hexachloride, KRENITE® Dinitro Spray, EPN 300 Insecticide, Calcium Arsenate, Lead Arsenate . . . *Weed and Brush Killers:* AMMATE,® 2,4-D, TCA and 2,4,5-T . . . *Also:* Du Pont Cotton Dusts, Du Pont Spreader-Sticker, PARMONE® Fruit Drop Inhibitor, and many others. ®REG. U. S. PAT. OFF.

On all chemicals always follow directions for application. Where warning or caution statements on use of the product are given, read them carefully.

Listen to Du Pont's "Cavalcade of America"—NBC—Tuesday Nights

DU PONT
REG. U. S. PAT. OFF.

150th Anniversary

Better Things for Better Living . . . through Chemistry

Famous the World Over

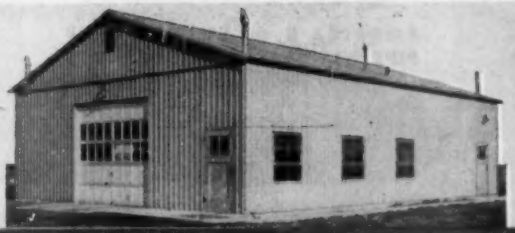
Wherever Oil Is Produced you'll find COLUMBIAN Bolted Steel Tanks delivering the same dependable, economical storage for which they have become famous through 59 years of leadership. Precision engineered—easy assembly—long-life, trouble-free service combine to assure users more profitable returns from every dollar invested in these top-rated tanks.

Columbian Bolted Steel Tanks are available now for oil producers. Columbian COP-NIC Tanks, especially for sour crude, will be available as conditions permit.

COLUMBIAN
BOLTED STEEL TANKS

COLUMBIAN ALL-METAL BUILDINGS

Save money on all your housing and storage needs with these rigid, strong, weather-tight, fire-safe all-metal buildings. Ideal as warehouses, engine houses, garages, shops, compressor and equipment houses. Require minimum upkeep. Write now for complete information.



COLUMBIAN STEEL TANK CO., P. O. Box 4048-J, Kansas City, Missouri

PIPING THAT MOVES

. . . calls for supports that are flexible

Grinnell Pre-Engineered Variable Spring Hangers installed in one of the largest catalytic cracking plants.

Grinnell Constant Support on piping operated at temperatures up to 1100°F.

Thermal deflection of piping in the high temperature piping systems of today's oil refineries requires supports that are flexible.

Where reactive forces at terminal points in a piping system must be kept within specified limits, constant-support type hangers are recommended. They are designed to provide substantially uniform supporting force equal to the pipe load throughout the travel range and should be used on high temperature and other critical lines.

When pipe lines are subject to vertical movement and restrictive conditions do not require the use of a constant-support type, variable spring hangers are recommended. They should be designed to support not less than 85% or more than 120% of the designed load for the total travel.

When necessary to prevent abnormal movement or vibration in pipe lines, controls or sway braces of the energy-absorbing or instant-acting, counter force type are recommended.

Grinnell manufactures a complete line of engineered pipe hangers and supports; maintains a laboratory staff of trained technicians; provides highly skilled assistance and advice right from the design stage; and offers experienced field engineering service.

GRINNELL MODEL L CONSTANT SUPPORTS— maintain full safety factor in high temperature, high pressure systems. 5 physical structures accommodate maximum travel requirements of 2½, 5 and 10 inches; 16 sizes collectively cover numerous load ranges between 141 and 19,530 pounds.

GRINNELL PRE-ENGINEERED SPRING HANGERS— maximum variation in supporting force per ¼" of deflection is 10½% of rated capacity— in all sizes. 16 sizes available from stock— load range from 74 lbs. to 9000 lbs.

GRINNELL VIBRATION CONTROL AND SWAY-BRACES— dampen vibration, oppose pipe sway and absorb shock. 3 sizes give full deflection forces from 200 to 1800 lbs.; have initial precompressed spring forces from 50 to 450 lbs. respectively.

GRINNELL

AMERICA'S #1 SUPPLIER OF PIPE HANGERS AND SUPPLIES

Grinnell Company, Inc., Providence 1, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies
industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

1902 • 1952

50 YEARS OF QUALITY LEADERSHIP

You Can Place Full Confidence in the Product of the Manufacturer Who Has Chosen CONTINENTAL RED SEAL as the Heart of His Machine

PARTS AND SERVICE EVERYWHERE

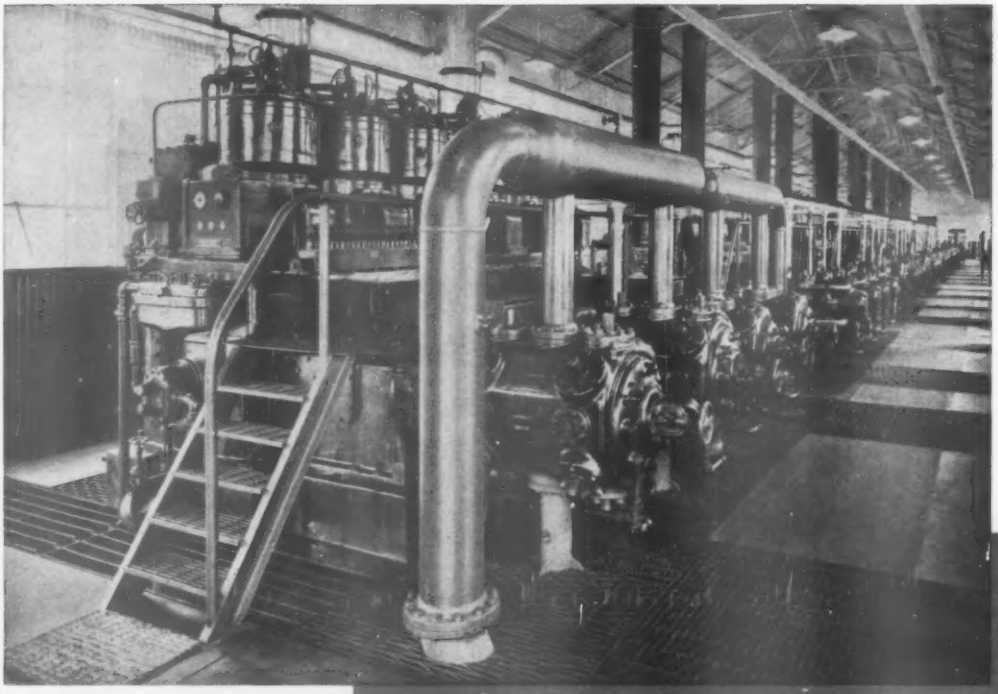
6218 CEDAR SPRINGS ROAD, DALLAS 9, TEXAS • 3817 S. SANTA FE AVE., LOS ANGELES 58, CAL.

Continental Motors Corporation

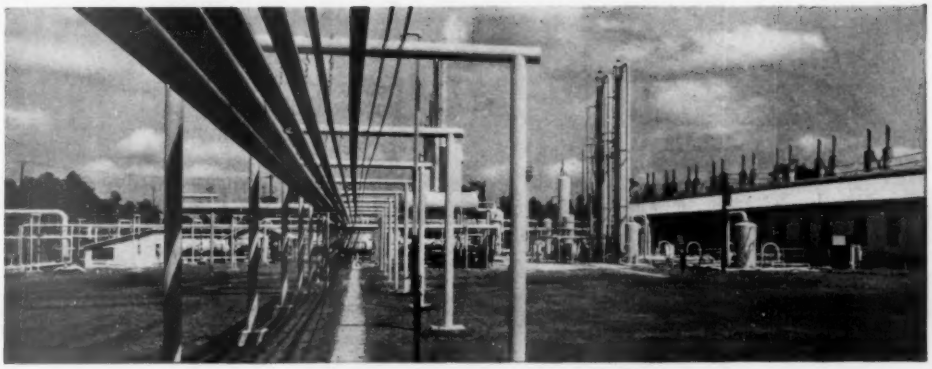
MUSKEGON, MICHIGAN

a mere .013" of power cylinder wear after 10 years' full-load operation

...that's Clark



Eight Clark RA-6, 600 bhp Right Angle Compressors in Shuler, Arkansas natural gasoline plant of Lion Oil Company



Compressor station (right) at Lion Oil Company's natural gasoline plant, Shuler, Arkansas

quality for you!

Clark "Right Angle" Compressors set remarkable record in Lion Oil Company operated Shuler Unit Natural Gasoline and Pressure Maintenance Plant

Power cylinder wear of less than .00125" per year after initial break-in! Total average wear of .013" per cylinder for the whole 10-year period!

. . . that's the remarkable record of six Clark RA-6, 600 bhp Right Angle, Gas-Engine-Driven Compressors operating continuously at full load since 1941 in Shuler Unit, Arkansas natural gasoline and pressure maintenance plant which is operated by Lion Oil Company.

But that's not all that's remarkable about this installation. The original power piston rings were in service for 8½ of those years before needing replacement.

Two other Clark RA-6 units operating since 1943 and 1948 respectively, are showing the same unusual resistance to wear . . . the same extremely low maintenance.

That's Clark quality and durability for you!

There's a BIG difference in . . . **CLARK®**

COMPRESSORS

CLARK BROS. CO., INC. • *One of the Dresser Industries* • OLEAN, N. Y.

Offices in Principal Cities throughout the World

traps help uncover hidden steam treasure

The facts are these:

A large southern chemical company about a year ago was up to capacity on their boilers. New process units were being added, requiring more steam—a new boiler seemed inevitable.

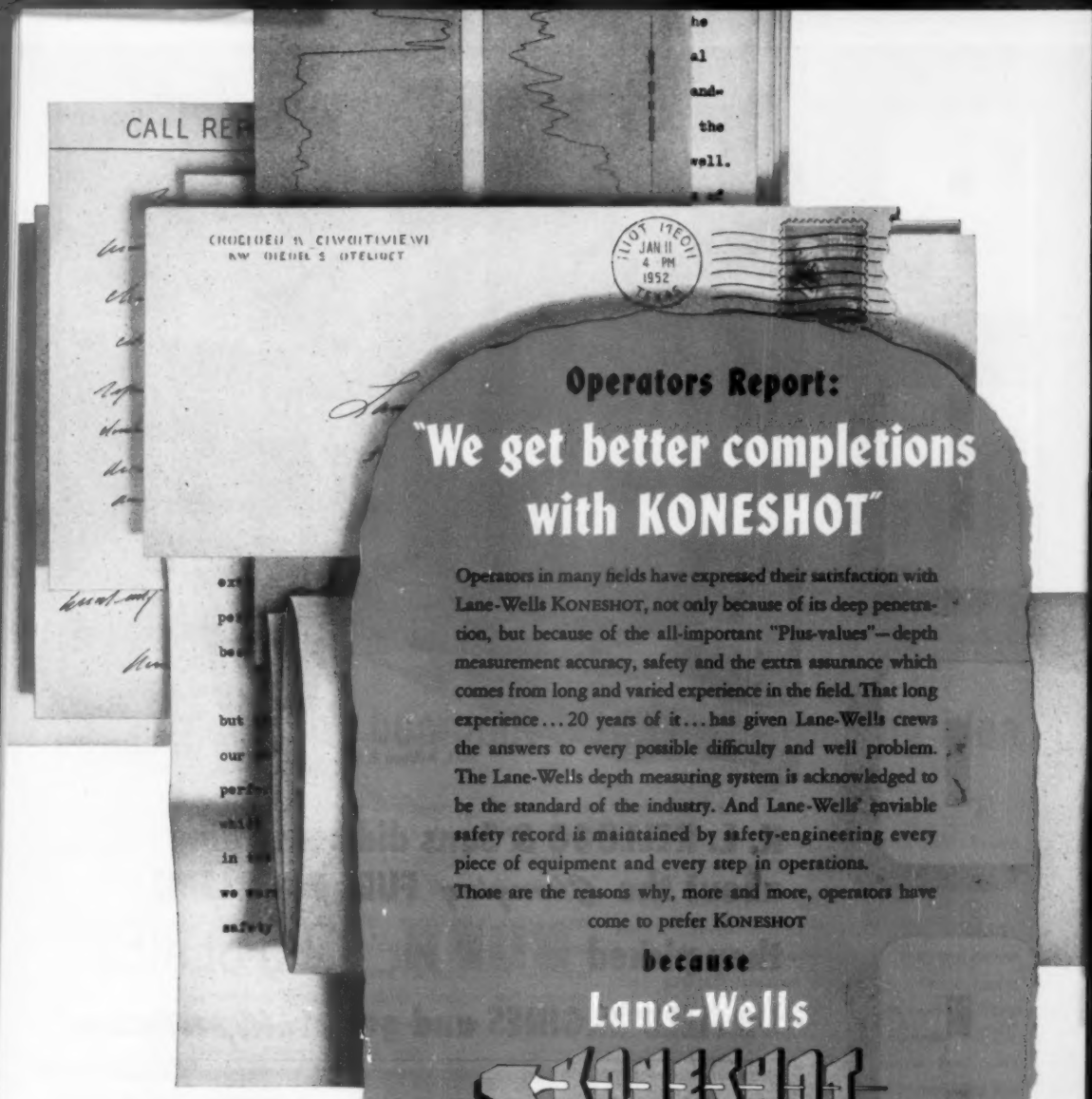
About that time they began replacing their old-type traps and bleed-off valves with Yarway Impulse Steam Traps and Strainers. Today, even with the new process units added, their daily steam consumption is nearly 100,000 lbs less than a year ago—the superintendent gives Yarway Impulse Traps credit for the saving.

Yarway Impulse Traps are *designed* to insure sending the most premium B.T.U.'s at top temperature into your product or process . . . *to get equipment hotter sooner and keep it hot!*

Yarway's have 11 other advantages, too—such as *small size, low maintenance, low cost, and availability* from over 200 Industrial Distributors.
Write for Bulletin T-1740. Or for steam trap advice, call on your nearby Yarway service engineer.

YARNALL-WARING COMPANY
136 Mermaid Avenue, Philadelphia 18, Pa.

the steam trap designed with more production in mind



Operators Report:

"We get better completions with KONESHOT"

Operators in many fields have expressed their satisfaction with Lane-Wells KONESHOT, not only because of its deep penetration, but because of the all-important "Plus-values"—depth measurement accuracy, safety and the extra assurance which comes from long and varied experience in the field. That long experience... 20 years of it... has given Lane-Wells crews the answers to every possible difficulty and well problem. The Lane-Wells depth measuring system is acknowledged to be the standard of the industry. And Lane-Wells' enviable safety record is maintained by safety-engineering every piece of equipment and every step in operations.

Those are the reasons why, more and more, operators have come to prefer KONESHOT

because

Lane-Wells KONESHOT is the "plus-value" shaped-charge perforating

20 years of Progress through Service

Tomorrow's Tools—Today!

LANE WELLS

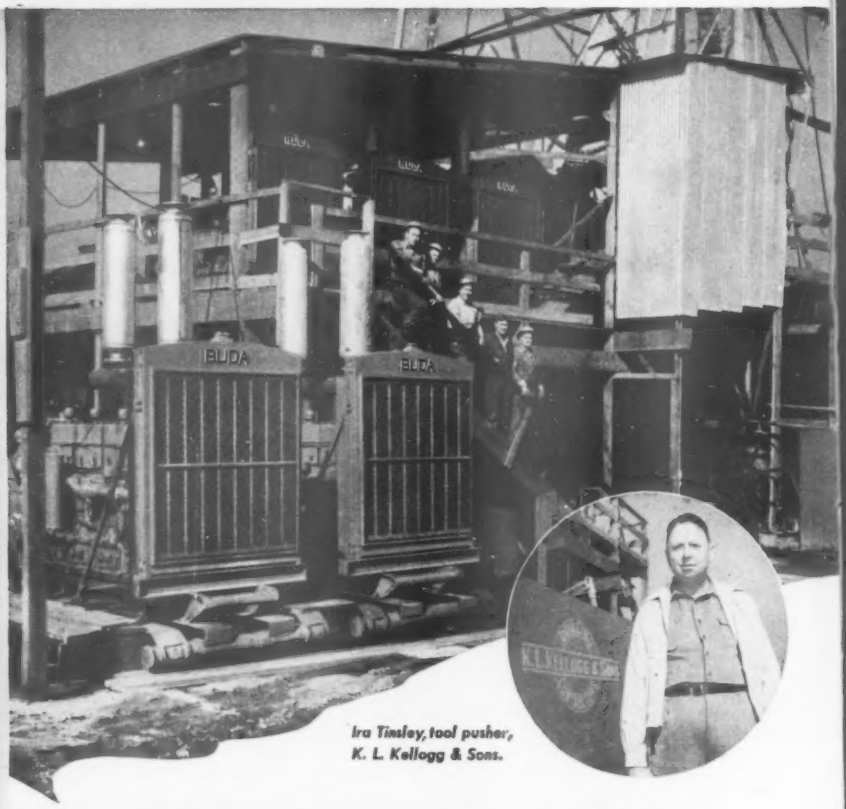
AK 504

General Offices, Export Office, Plant • 5610 So. Soto St., Los Angeles 58

LOS ANGELES • HOUSTON • OKLAHOMA CITY • LANE-WELLS CANADIAN CO. IN CANADA • PETRO-TECH SERVICE CO. IN VENEZUELA

BUDA

WHEREVER THERE'S OIL THERE'S BUDA ENGINES PARTS AND SERVICE



Ira Tinsley, tool pusher, K. L. Kellogg & Sons.

K. L. KELLOGG & Sons did something about the *Changing* FUEL PROBLEM! they picked BUDA "2505 SERIES" OILFIELD ENGINES and got *double protection!*

K. L. KELLOGG & Sons POWERS RIGS and PUMPS with BUDAS

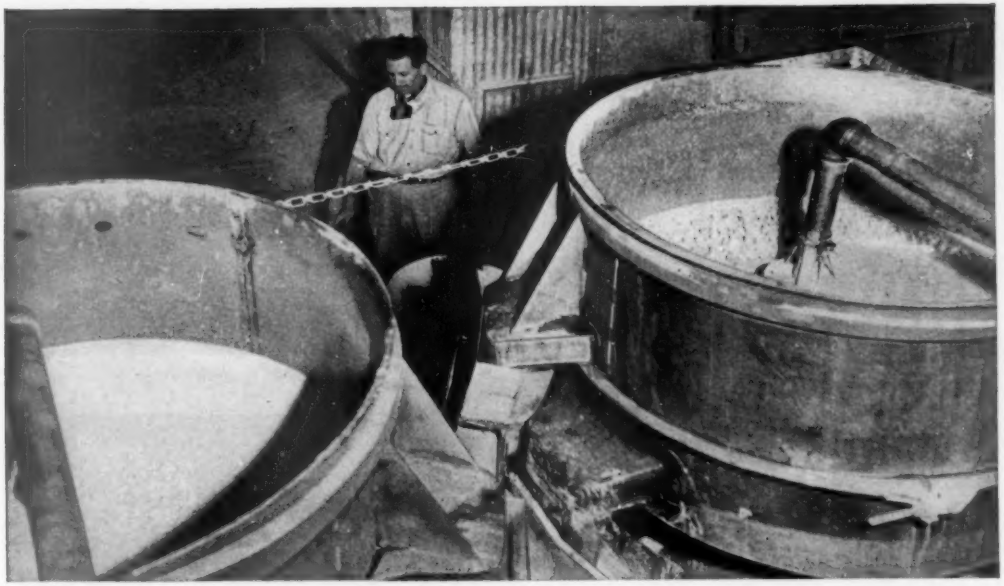
Availability and cost of fuel are no longer a problem with the Drilling Contractor who powers with Buda "2505" Series Oilfield Engines and the "Fuecomizer Kit" which permits quick, low cost conversion from full Diesel to full gas operation, or vice versa.

K. L. Kellogg & Sons, prominent California Drilling Contractors bought the five Buda "2505" Series Engines shown above to power their National Model 125 Drilling Rig because the conversion feature in all "2505" Series Oilfield Engines solves the changeable fuel problem easily and economically. Don't overlook this *double protection* that you can get only in Buda "2505" Series Engines. It's more important now than ever.

Ask your Buda Oilfield Distributor for full details on Buda's 2 in 1 "2505" Engine Deal today. Data and Specifications sent without obligation. The Buda Company, Harvey, Ill.

BO-26

BUDA Oilfield Distributors are located in: Dallas • Tulsa • Los Angeles • Houston • Oklahoma City • Seminole • Wichita Falls • Shreveport • Bakersfield • Tinsley • Pampa Great Bend • Long Beach • Kilgore • Mt. Carmel, Ill. • Alice • Odessa • Casper • Denver • Brookhaven • New York City (Export) and in Canada at Calgary and Edmonton



Shaking the bugs out of a new screening idea

When Southwestern Engineering Company, of Los Angeles, came up with the idea of a screen separator with "bumps *and* grinds"—bouncing *and* vibrating action—they knew they had something.

Something that might speed up sluggish separating processes tremendously. In oil, for example, where the "sluggard" is mud... in chemical processing where it's thick sludges and mineral powders . . . in ceramics where it's a silica-clay-talc-water slurry called "slip."

The idea was swell. But working it out, finding the right metal for the cylinders, was a lulu.

They'd try one. It wouldn't meet the acid test ...quite. And would contaminate some products ever so slightly, but ever so disastrously.

They'd try another. Tons of jiggling mix would eventually break its back.

Still another. The cylinders would keep splitting at the seams.

Finally, they tried Monel. And they were in. No more trouble, no matter how much machines were overloaded or over-speeded!

First to take advantage of this new Sweco development was Gladding McBean & Co.

They installed the two Sweco separators shown here to screen clay slip for their famous "Hermosa" wall and floor tile. And by so doing, they improved their product because they were able to use a finer clay . . . boosted production because they could handle slip with only 40% instead of 51% water (thereby saving about 35% on fuel costs in the subsequent drying)...and increased the life of the screen cloth from *4 days to 26 months!*

Now what about your metal problem?

Could one or another of the Inco Nickel alloys help solve it? Very possibly. Write us about it. Remember, however, that Nickel and its alloys are on extended delivery. So anticipate need . . . order well in advance giving NPA rating and full end use information.

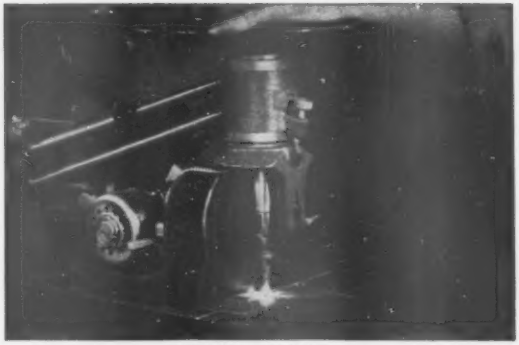
The International Nickel Company, Inc.
67 Wall Street, New York 5, N.Y.

NICKEL (INCO) ALLOYS

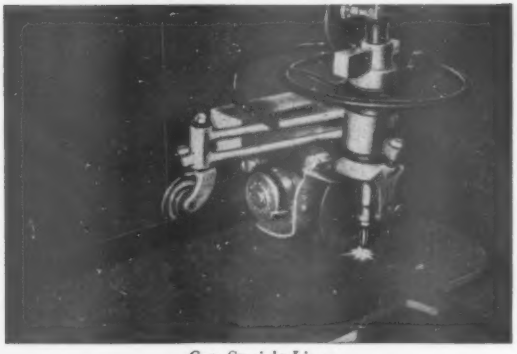
MONEL® • "R"® MONEL • "K"® MONEL • "KR"® MONEL
"S"® MONEL • NICKEL • LOW CARBON NICKEL • DURANICKEL®
INCONEL® • INCONEL "X"® • INCOLOY® • NIMONICS

PARTS UNLIMITED

... in Jig Time



Cuts Irregular Shapes



Cuts Straight Lines

Cuts Circles

In large and small shops alike, the OXWELD CM-16 Portable Cutting Machine fills an unbelievably wide variety of oxygen cutting requirements. It cuts circles automatically. Hand-guided, it cuts irregular shapes. Operated on track, it cuts straight lines.

Indoors or out—wherever steel needs shaping—the CM-16 makes it easy to "tailor" parts as fast as the work can be laid out. *And its ready adaptability for special jobs is limited only by its operator's ingenuity!*

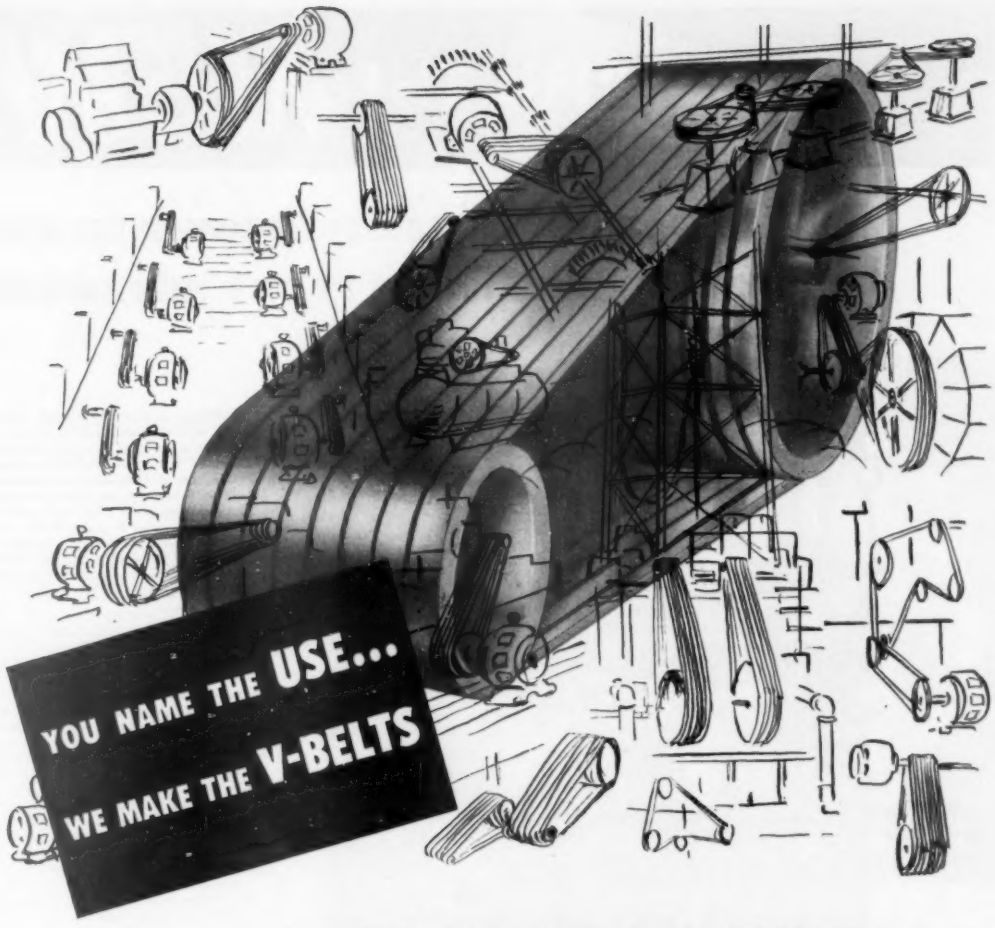
The CM-16 sets up as quickly as any manual outfit. It weighs only 45 lb., travels directly on the work, and is easy to carry from job to job. In normal use, it cuts up to 4 in. of steel; with standard accessories, it cuts materials up to 18 in. thick and it cuts bevels.

Any LINDE representative will be glad to show you how the OXWELD CM-16 Portable Cutting Machine can boost production and cut fabricating costs in your shop. Write for catalog, Form 4487, or call the LINDE Office nearest you today for a free demonstration.

The terms "Linde" and "Oxweld" are registered trade-marks of Union Carbide and Carbon Corporation.

LINDE AIR PRODUCTS COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
Offices in Other Principal Cities
In Canada: DOMINION OXYGEN COMPANY, LIMITED, Toronto

Oxweld Trade-Mark **CM-16 PORTABLE CUTTING MACHINE**



Condor V-Belts can save you money on any type of Multiple Belt drive . . . for any use . . . in any industry. They are the smoothest running V-belts made because every part of the construction is *precision-balanced*. Straight sidewalls provide more grip, less slip, longer life. They are made also in special oil, heat, and static-resisting constructions • V-Belts may not be your problem today but whenever you think of hose, of conveyor, transmission, V-belts, or industrial rubber products for *any* use — remember "Raybestos-Manhattan makes it". Consult your R/M representative.

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

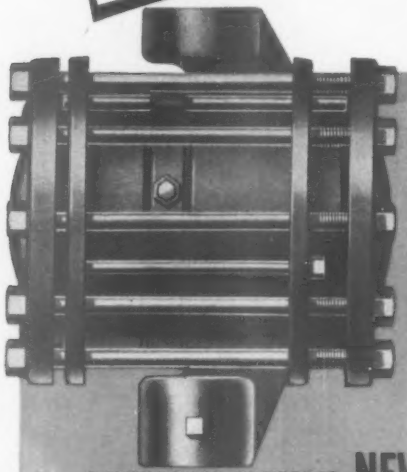
RAYBESTOS-MANHATTAN, INC.

Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Packings • Brake Linings • Brake Blocks Clutch Facings • Asbestos Textiles • Sintered Metal Parts • Bowling Balls

Another AMERICAN® Advance

THE NEW

A MERCURYLESS METAL SUPPLEMENTING



AMERICAN METER'S NEW DIFFERENTIAL PRESSURE MEASUREMENT INSTRUMENT—

Adaptable to all American Pneumatic Controllers, Transmitters, Differential Valves, Telemeters and related instruments.

For differential pressure applications where accurate measurement is required without the use of a mercury manometer, American Meter Company now offers a bellows actuated instrument designed and built with characteristic American precision in ranges of 50", 100" and 200" for working pressures to 1,000 P.S.I. These new instruments are designed for ease of installation, accurate performance and minimum maintenance under rugged operating conditions.

• • •

Range changes are made easily and simply by removal of the low-side cover for access to the range spring without disturbing the high-side cover or any connections. Calibration, virtually tamper-proof since all adjustments are internal, is readily performed by applying the differential pressure on the high-side with low-side cover removed. Damage or distortion to the bellows due to sudden over-range is prevented by stick-proof check valves with flat, synthetic seats. An additional bellows compensates for volume changes in bellows filling fluid resulting from ambient temperature variations. The Teflon-sealed pulsation dampener, for accurate control of instrument response, is externally adjustable under pressure.

• • •

American is and will continue to be the first name in metering dependability. For complete information on this latest addition to the American line . . . built with the precision and extreme care characteristic of American Meter Company's century-old tradition of "Sustained Accuracy at Lower Cost" . . .

Write for Specifications or Call the Nearest Office Listed Below

NO PRECISE LEVELLING — NO SEAL POTS REQUIRED
Pedestal, Panel or Overhead Hanger Mounting
— Top and Bottom Gage Line Connections

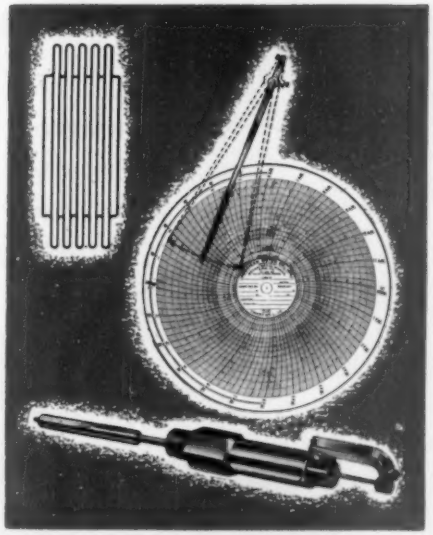
FOR WORKING PRESSURES TO 1,000 P.S.I.
... AMBIENT TEMPERATURES OF
—25° TO 175°F.

GENERAL SALES OFFICE: 1513 Race Street, Philadelphia
Albany • Alhambra • Atlanta • Baltimore • Birmingham • Boston • Chicago
Dallas • Denver • Erie • Houston • Kansas City • Los Angeles • Minneapolis
New York • Odessa • Omaha • Pittsburgh • San Francisco • Tulsa
Canadian Meter Co., Ltd., Hamilton, Ontario • Edmonton, Alberta

DRI-FLO ORIFICE METER

BELLOWS DIFFERENTIAL PRESSURE INSTRUMENT

THE AMERICAN WESTCOTT MERCURY MANOMETER ORIFICE METERS



- **ONE-PIECE STAINLESS STEEL BELLOWS CONSTRUCTION**

  Large area, fluid filled, *seamless* stainless steel bellows provide longer service life with minimum possibility of leaks caused by metal fatigue.

- **DIRECT FULL SCALE RECORDING PEN MOVEMENT— NO EXTERNAL GEARING OR LINKAGE MULTIPLICATION**

  Recording pen arm travels through the full 22½ degree arc without complex external gearing or linkage multiplication. Standard American Westcott charts are used.

- **AMERICAN TYPE "B" TEFLON SEAL STUFFING BOX NEEDS NO LUBRICATION**

  Noted for simplicity, this nearly frictionless precision unit provides maximum accuracy . . . *Requires No Lubrication.* All stuffing box parts are removable and replaceable in the field . . . *No Shaft Freezing; No Leakage.*

- **STAINLESS STEEL INTERNAL WORKING PARTS**

  All internal operating parts of the new DRI-FLO Orifice Meter are of stainless steel except the ground and polished stuffing box shaft which is Monel metal. Body is cast steel.

- **READILY ACCESSIBLE FOR CLEANING**

  The meter body and internal working parts are easily accessible for inspection, calibration and cleaning by removing one or both case cover heads . . . without disturbing manifold piping.

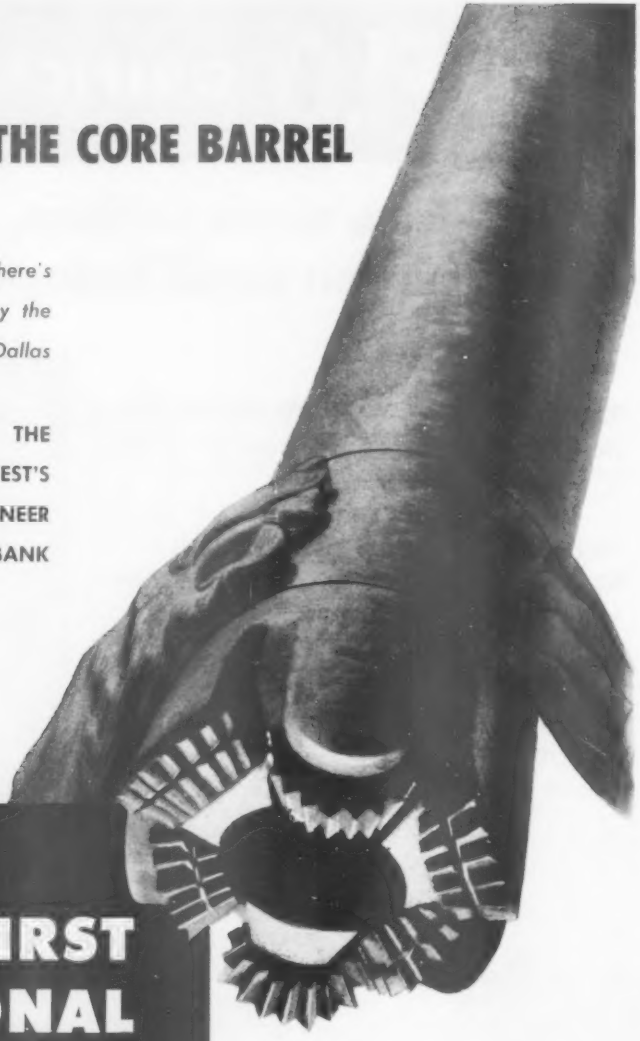
AMERICAN METER COMPANY
INCORPORATED ESTABLISHED 1836

AMERICAN METER COMPANY EST. 1836 MEASUREMENT ENGINEERS

AHEAD OF THE CORE BARREL

First there's financing by the FIRST in Dallas

THE SOUTHWEST'S PIONEER OIL BANK



FIRST NATIONAL BANK IN DALLAS

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

Give us an opportunity to say YES

JOY

200-Series Motorized Drill Rigs

Built and Field-Proved in 3 models to do your job best!

This family of fast, highly mobile oil field drills—the JOY 225, 250 and 275 Motorized Drill Rigs—are built for deep structure-testing and water-well work, or shallow slim hole production, down to 3000 feet. They are truck or trailer-mounted units with interchangeable parts, reversible rotary mechanism, single or compound engine drive, hydraulic or ordinary feed. An exclusive feature of the 225 and 250 Drill Rigs is the JOY Automatic Hydraulic Chuck, a proved labor saver — reduces costs, increases speed, actually can mean as much as 200′ more hole per day. ● *Ask for complete details.*

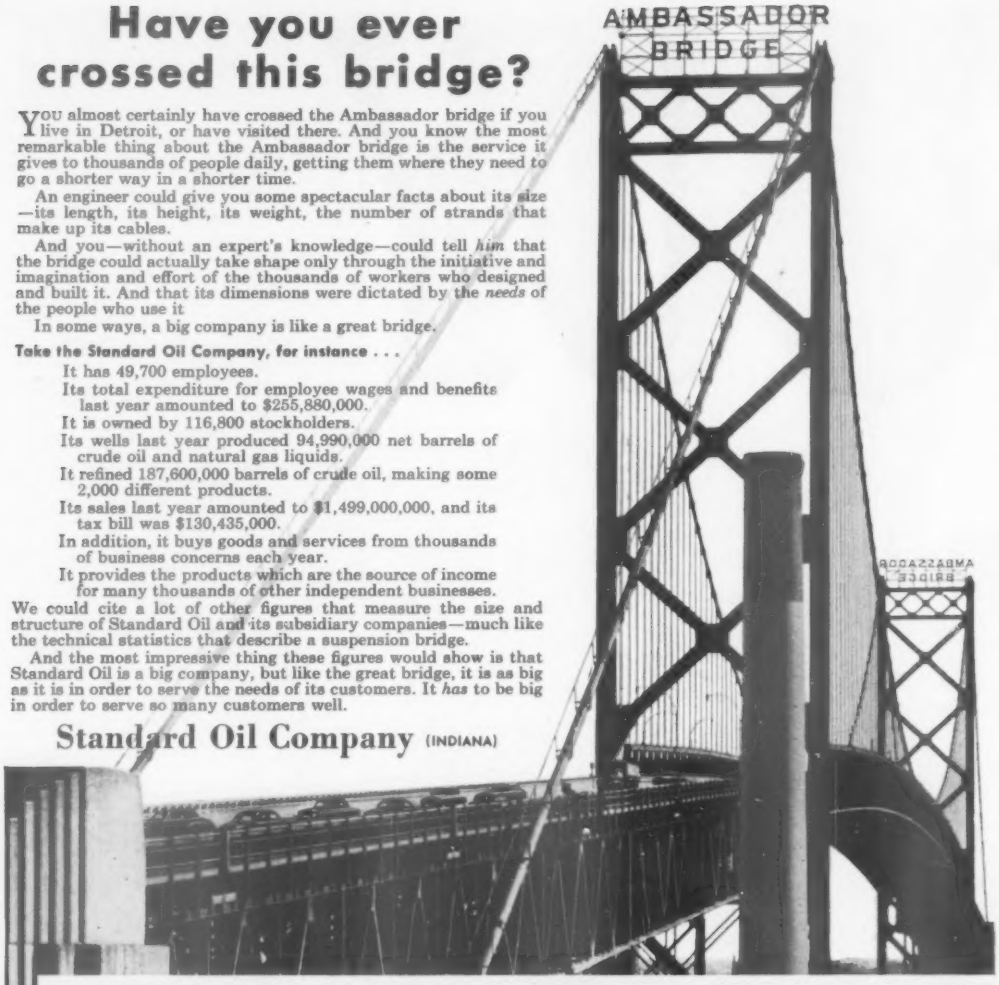
Write for Bulletins, or *Consult a Joy Engineer*

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

Have you ever crossed this bridge?



You almost certainly have crossed the Ambassador bridge if you live in Detroit, or have visited there. And you know the most remarkable thing about the Ambassador bridge is the service it gives to thousands of people daily, getting them where they need to go a shorter way in a shorter time.

An engineer could give you some spectacular facts about its size—its length, its height, its weight, the number of strands that make up its cables.

And you—without an expert's knowledge—could tell *him* that the bridge could actually take shape only through the initiative and imagination and effort of the thousands of workers who designed and built it. And that its dimensions were dictated by the *needs* of the people who use it.

In some ways, a big company is like a great bridge.

Take the Standard Oil Company, for instance . . .

It has 49,700 employees.

Its total expenditure for employee wages and benefits last year amounted to $255,880,000.

It is owned by 116,800 stockholders.

Its wells last year produced 94,990,000 net barrels of crude oil and natural gas liquids.

It refined 187,600,000 barrels of crude oil, making some 2,000 different products.

Its sales last year amounted to $1,499,000,000, and its tax bill was $130,435,000.

In addition, it buys goods and services from thousands of business concerns each year.

It provides the products which are the source of income for many thousands of other independent businesses.

We could cite a lot of other figures that measure the size and structure of Standard Oil and its subsidiary companies—much like the technical statistics that describe a suspension bridge.

And the most impressive thing these figures would show is that Standard Oil is a big company, but like the great bridge, it is as big as it is in order to serve the needs of its customers. It *has* to be big in order to serve so many customers well.

Standard Oil Company (INDIANA)

A BIG COMPANY depends upon the many, many people who work for it. Each of the 49,700 employees of Standard Oil, like L. L. Noel of our Neodesha, Kansas, refinery, are backed by an average investment of $31,400 in tools and equipment. This is largely made possible by the fact that in recent years two-thirds of our profits have been plowed back into the business. Such backing helps our employees to earn good wages and enjoy the security of steady work.

A BIG COMPANY is owned by many, many people. Among Standard Oil's 116,800 stockholder-owners is Miss Lottie Klandrud, La Crosse, Wisconsin, business woman who has owned Standard Oil stock for more than twenty years. No one individual owns so much as 1% of our stock. No one of the institutional owners—including many educational institutions and charitable organizations—owns so much as 4%. Standard Oil has paid dividends for 59 consecutive years.

A BIG COMPANY must continue to satisfy its many, many customers. Standard Oil has millions of customers like Mrs. Ruth B. Taylor of Kansas City, Kansas, who is a regular customer of George Isaacs, one of the thousands of Standard Oil dealers. Through the friendly and efficient service of independent businessmen like him, we supply our customers' needs with products—priced surprisingly low—that they can rely on for highest quality today, and tomorrow.

BIG "CAT" THAT GREW IN BROOKLYN

New Catalytic Refining Unit Produces

50% MORE HIGH-QUALITY MOBILGAS FOR NEW YORK AREA THIS WINTER!

Flying Red Horse Leadership Proved Again!

SOCONY-VACUUM has just completed building one of its largest and most modern Catalytic Cracking Units . . . right here in the metropolitan area. This new unit provides greatly expanded capacity for producing the original *Flying Horsepower* gasoline.

A Catalytic Poly Unit has also been erected to produce the highest octane number components for Mobilgas and Mobilgas Special!

These new units are producing increased quantities of Mobilgas and Mobilgas Special for the metropolitan area . . . plus super high-power gasoline ingredients to assure top winter pep and performance from your car.

From now on you'll enjoy: split-second starts plus faster warm-up, smoother acceleration . . . powerful anti-knock performance, even in highest compression cars!

Mobilgas
SOCONY-VACUUM

SOCONY-VACUUM OIL COMPANY, INC.

Drive In at the Sign of Friendly Service!

This advertisement appeared recently in Greater New York newspapers.

$60,000 | U. S. GOVERNMENT AND AGENCY BONDS | LOCKHEED BACKLOG | MONEY | OFFERING

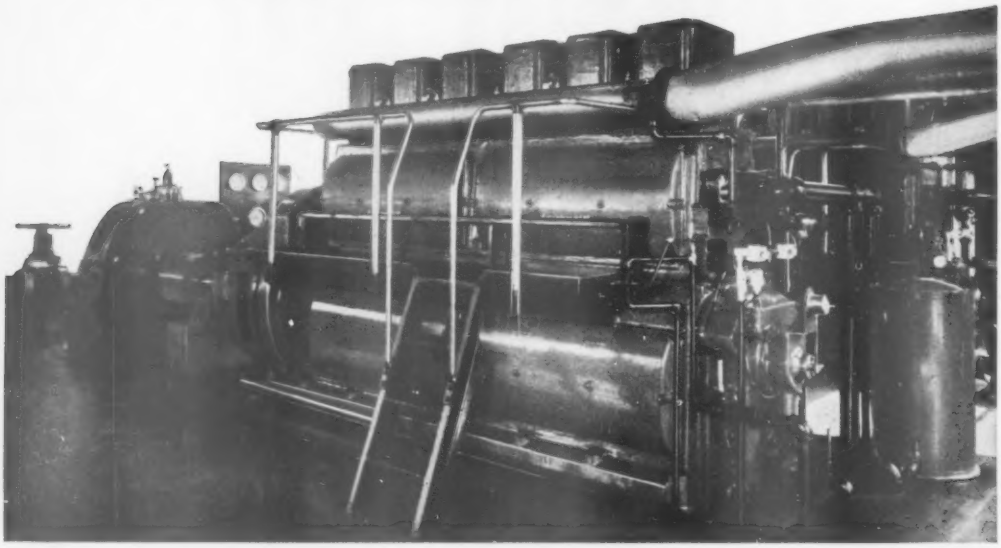
Sounded on Raymond standard piles . . .

Raymond
CONCRETE PILE CO.
140 Cedar Street • New York 6, N. Y.

SCOPE OF RAYMOND'S ACTIVITIES . . .
Foundation Construction . . . Harbor and Waterfront Improvements . . . Soil Investigations . . . In-Place Pipe Lining . . . Specialized Construction.

Branch Offices in the Principal Cities of United States and Central and South America

at the Anthony Station of Magnolia Pipe Line . . .



89.6% of elapsed time

for 11 years . . . that's Alco dependability

On-the-job performance—the toughest test of all shows what Alco Standardized Diesels can do. Two of these engines installed at the Anthony Station of the Magnolia Pipe Line have each rolled up over 90,000 hours of operation since installation. They have run as much as 94.9% of the elapsed time in a single year.

In addition to this kind of performance, pumping station superintendents also like Alco Standardized Diesels because of their economy:

- **Compactness** for lower construction costs
- **Higher engine efficiency** for lower fuel costs
- **Medium speed** for lower auxiliary equipment costs
- **Flexible power range** for lower expansion costs

In the last ten years *more Alco Diesel Engines have been installed in oil pipe line pumping service in the United States and Canada, than any others.* To find out how they can help you, contact your nearest American Locomotive Company Sales Office at Beaumont, Chicago, Cleveland, Houston, Kansas City, New York, San Francisco, Schenectady or St. Louis.

ALCO DIESELS

THE MARK OF MODERN ENGINEERING

AMERICAN LOCOMOTIVE COMPANY

***In step with tomorrow*—ALCO AIRCOOLERS, Heat Exchangers, Evaporators, Feedwater Heaters, Pressure Vessels, Pipe**

Here's another reason why the 'Specs' call for "WELDOLETS"

Extra strong WeldOlets, butt-welding, utilized to make fully reinforced branch connections in Gas Measurement Headers

LET'S COMPARE THE PLUS FEATURES OF WELDOLETS AGAINST REINFORCING RINGS OR PADS

1. The WeldOlet is a Welding Fitting rather than a hand-made reinforcement of a hand-made joint. It is both a mechanical and a pressure member.

2. The self-aligning, shaped and beveled WeldOlet is equally adaptable for shop or field fabrication. Its employment eliminates the need for additional reinforcement.
3. Production economy is realized by employment of WeldOlet construction which speeds up installation time in both shop and field fabrication. Only two welds are required to install WeldOlets.
4. The WeldOlet type of construction inherently provides sufficient reinforcement in accordance with Code requirements to meet or surpass the maximum services of whatever weight pipe is used. To facilitate determination of where it is necessary to reinforce or to use a WeldOlet, the new Bonney catalog W-3 features time-saving data on this subject.
5. Dimensional advantages of WeldOlets allow closer manifolding and cross combinations and provide improved flow conditions.

1. Precious pipe is wasted in making reinforcing rings or pads.

2. Reinforcing rings can be cumbersome to handle and clumsy to fit in both shop and field fabrication.
3. Excessive welding is necessary to complete branch reinforcing requirements according to Code provisions when rings or pads are used. Three separate welds are required. This slows down piece production time in both shop and field fabrication.
4. Lengthy calculations are necessary to determine the amount of reinforcing required when designing for ring or pad reinforcement.

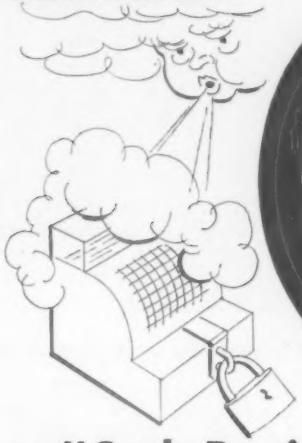
The Bonney Catalog No. W-3 will show you why WeldOlet Welding Fittings offer the quickest, safest and most economical method of establishing and maintaining 100% pipe strength at branch connections in accordance with Code provisions. Write for your free copy.

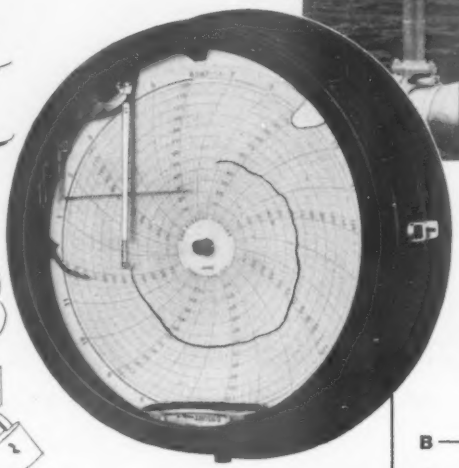
CANADIAN REPRESENTATIVE
Sterling Steel Co., Ltd.
267 Davenport Road
Toronto 1, Canada

EXPORT DISTRIBUTOR
National Supply Co. Export Div.
600 Fifth Ave., New York 20, N.Y.

BONNEY FORGE & TOOL WORKS

GUARD YOUR TILL FROM OLD MAN WEATHER





Above — Foxboro Anti-Ambi Recorder and Foxboro Flow Meter.

Left—The Anti-Ambi Recorder

on "Cash Register" metering

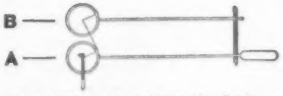
You can be sure you're ringing up your full money's worth of *actual* gas volume — regardless of weather ups and downs — when you have the protection offered by Foxboro Anti-Ambi Temperature Recorders.

In orifice-type metering, a variation of only 10° F. in gas temperature will cause an error of 1% in metered volume, unless corrected. And that means substantial losses over a prolonged period. With Foxboro Anti-Ambi Temperature Recorders you get continuous, accurate records, permitting full correction for temperature variations and precise computation of gas delivery in standard volume units.

The Anti-Ambi Recorder has the ruggedness and accuracy typical of Foxboro Instruments. Weather-tight case permits installation out-of-doors. Fully compensated for ambient temperature changes. These are some of the reasons why the gas industry uses more Foxboro Anti-Ambi Temperature Recorders than all others combined.

Write for complete information. **The Foxboro Company, 606 Neponset Ave., Foxboro, Mass., U.S.A.**

TYPICAL FOXBORO REFINEMENTS



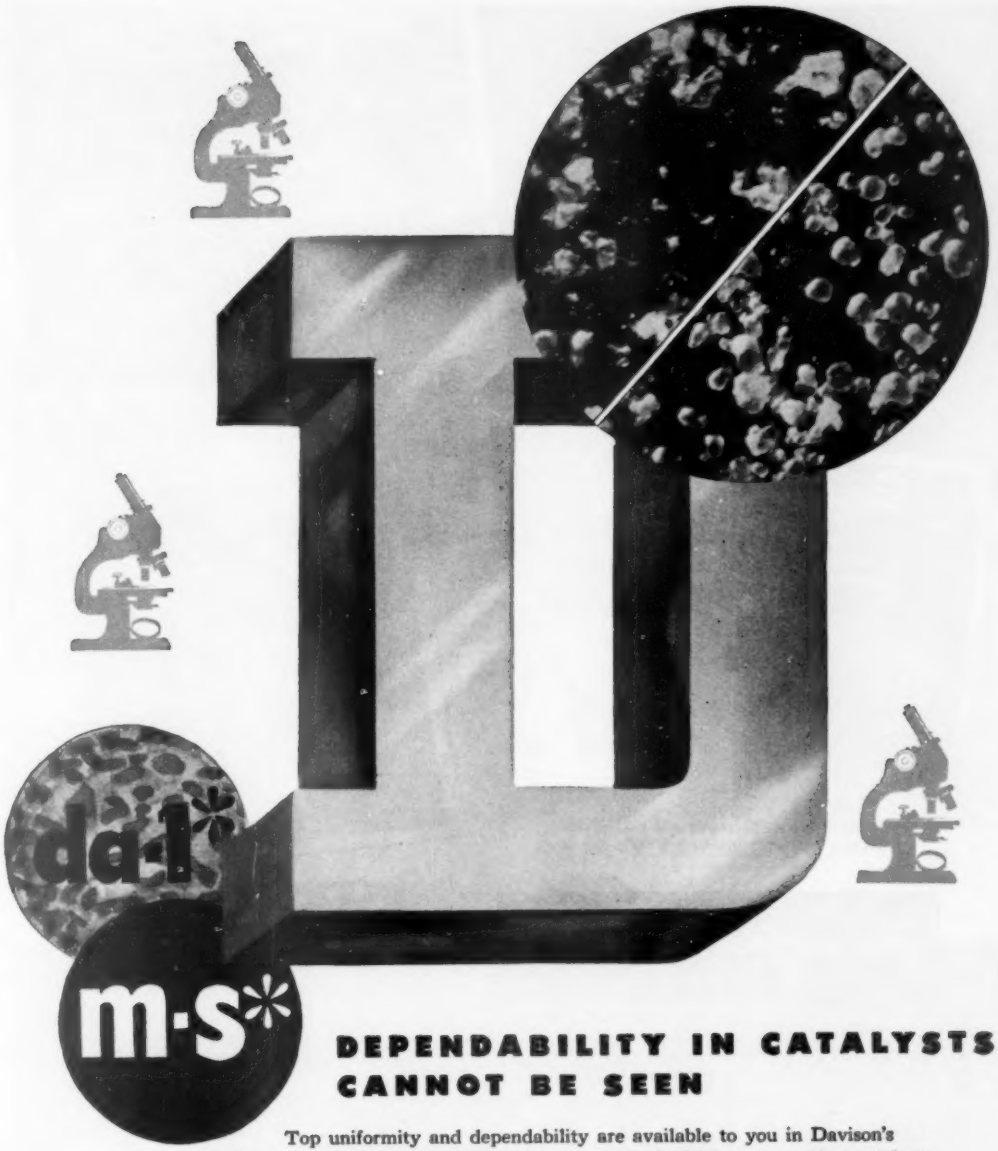
The diagram above shows the Foxboro automatic compensation for ambient temperatures. Measuring and compensating elements are located in the same case, and capillaries for both systems are in the same protective tubing. The compensating system automatically resets the primary measuring system to correct for ambient temperature changes. Instrument and compensation are calibrated at same time.

Here's the small-diameter, quick-response bulb used with the Foxboro Anti-Ambi Thermometer. Bulb is made with a stainless steel neck to reduce conduction effects.

The bulb is generally protected by the special socket shown above. It has aluminum fins for rapid heat transfer, and a stainless steel extension to minimize heat conduction to the socket head.

FOXBORO REG. U. S. PAT. OFF. **Anti-Ambi THERMOMETERS**

FACTORIES IN THE UNITED STATES, CANADA AND ENGLAND



DEPENDABILITY IN CATALYSTS CANNOT BE SEEN

Top uniformity and dependability are available to you in Davison's microspheroidal (M-S*) or ground (DA-1*) synthetic fluid-type cracking catalysts. The accompanying photomicrographs show the physical characteristics of the DA-1 and new M-S catalysts produced in Davison's Cincinnati plant. Uniform physical and catalytic characteristics result from Davison's modern facilities and years of technical experience and research Experienced Davison Field Service Engineers—complete laboratory facilities—are all part of Davison Dependability—Dependability with the big "D".

*T.M.T.D.C.C.

Progress Through Chemistry

THE DAVISON CHEMICAL CORPORATION

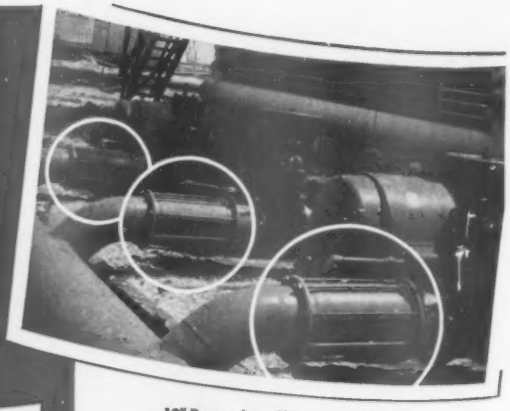
Baltimore 3, Maryland

PRODUCERS OF: CATALYSTS, INORGANIC ACIDS, SUPERPHOSPHATES, PHOSPHATE ROCK, SILICA GELS, SILICOFLUORIDES AND FERTILIZERS

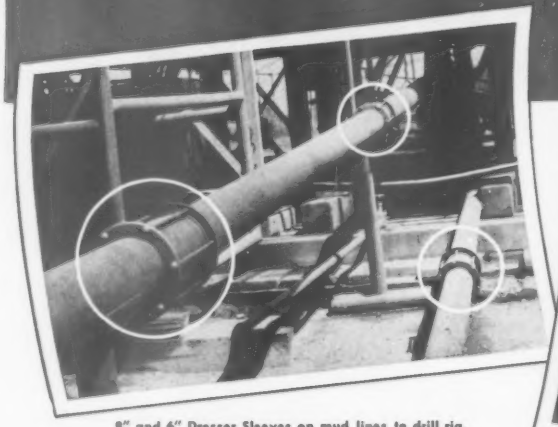
mighty handy..

to have around an oil field

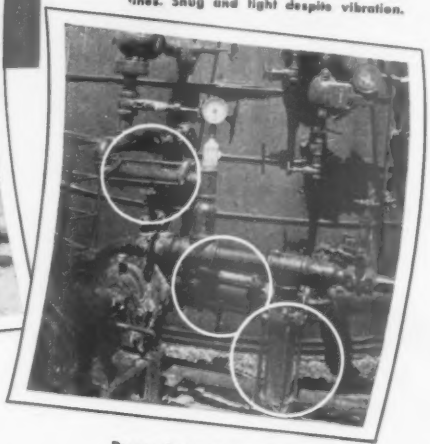
DRESSERS



10" Dresser Long Sleeves on cooling tower lines. Snug and tight despite vibration.



8" and 6" Dresser Sleeves on mud lines to drill rig. "Flexible-Tightness" absorbs line "give and take".



Dresser Style 40 Long Sleeves on salt water tank. Easy to connect. Always dependable.

from your favorite supply dealer

Alamo Iron Works
American Supply Co.
Banks-Miller Supply Co.
Bethlehem Supply Co.
F. W. Black
Bovaird & Co.
Bovaird & Seyfang Mfg. Co.
The Bovaird Supply Co.
Bradford Supply Co.
Briggs-Weaver Machinery
Brown-Strauss Corp.
The Cameron & Barkley Co.
Capital City Supply Co.
Cen-Tex Supply Co.
Clover & Cowan, Inc.
Coastal Supply Co., Inc.
The Continental Supply Co.
Cooper Supply Co.
C. W. Cotton Supply Co.
Crane Co.
Dunigan Tool & Supply Co., Inc.
Federal Oil Field Supply Co.
Franklin Supply Co.
Frick & Lindsay Co.
General Oil Field Supply
Grinnell Co., Inc.
Houston Oil Field Material Co., Inc.
Howard Supply Co.
Industrial Supply Co.
Iverson Supply Co.
Jarecki International Supply Div.
Jones & Laughlin Supply Co.
Keystone Pipe & Supply Co.
Lloyd-Smith Co., Inc.
Louden Tool Co.
Louisiana Supply Co.
The McJunkin Supply Corp.
Mid-Continent Supply Co.
Midland Supply Co., Inc.
Monsen Dunnegan Ryan Co.
Morrison Supply Co.
Mountain Iron & Supply Co.
Murray-Brooks, Inc.
The National Supply Co.
Norwell-Wilder Supply Co.
Oil Well Supply Div.
Peden Iron & Steel Co.
Peerless Supply Co., Inc.
Pelican Well Tool & Supply Co.
The Producers Supply & Tool Co.
Republic Supply Co.
The Republic Supply Co. of Calif.
San Antonio Machine & Supply Co.
Spain Supply Co.
Standard Supply & Hardware Co., Inc.
Superior Iron Works & Supply Co., Inc.
United Supply & Mfg. Co.
Weaks Supply Co., Ltd.
Well Machinery & Supply Co., Inc.
Western Supply Co.
Wilson Supply Co.
Jack Yates Pipe & Supply.

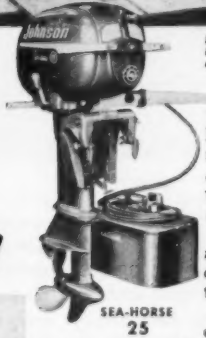
DRESSER COUPLINGS and Repair Products

Dresser Manufacturing Division, 59 Fisher Ave., Bradford, Pa. Warehouses: 1121 Rothwell St., Houston, Texas; 101 S. Bayshore Highway, South San Francisco, California. Sales Offices: New York, Philadelphia, Chicago, Houston, South San Francisco. In Canada: 629 Adelaide St., W., Toronto.

OUTBOARDS GO ANYWHERE!

Red River gas pipe line crossing, by the Arkansas-Louisiana Gas Company of Shreveport. The outboard motor is a Johnson Sea-Horse 10.

Johnson SEA-HORSES for DEPENDability



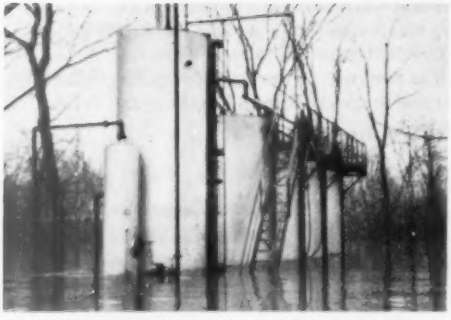
SEA-HORSE 25

Here's a real test of outboard motor maneuverability—proof that outboards go *anywhere!* In shallow and obstructed waters, in tight places, it's the *only practical* marine power.

In oil and gas work, DEPENDability is a "must." That's why so many companies choose Johnson Sea-Horse outboard motors for their water operations.

With Johnson outboard motors, you can convert your work boats into DEPENDable power craft—at a fraction of the cost of inboard installations. You can operate economically—fuel consumption is low, repairs are quick and reasonable. You can transfer your power from boat to boat. And you can maneuver in waters where other types of boats dare not venture.

See your Johnson dealer. Ask about the outstanding Johnson features—Gear Shift (neutral-forward-reverse), Mile-Master Fuel Tank, Synchro Twist-Grip Speed Control, Neutral Clutch, and Angle-matic Drive. Look for his name under "Outboard Motors" in classified phone book.



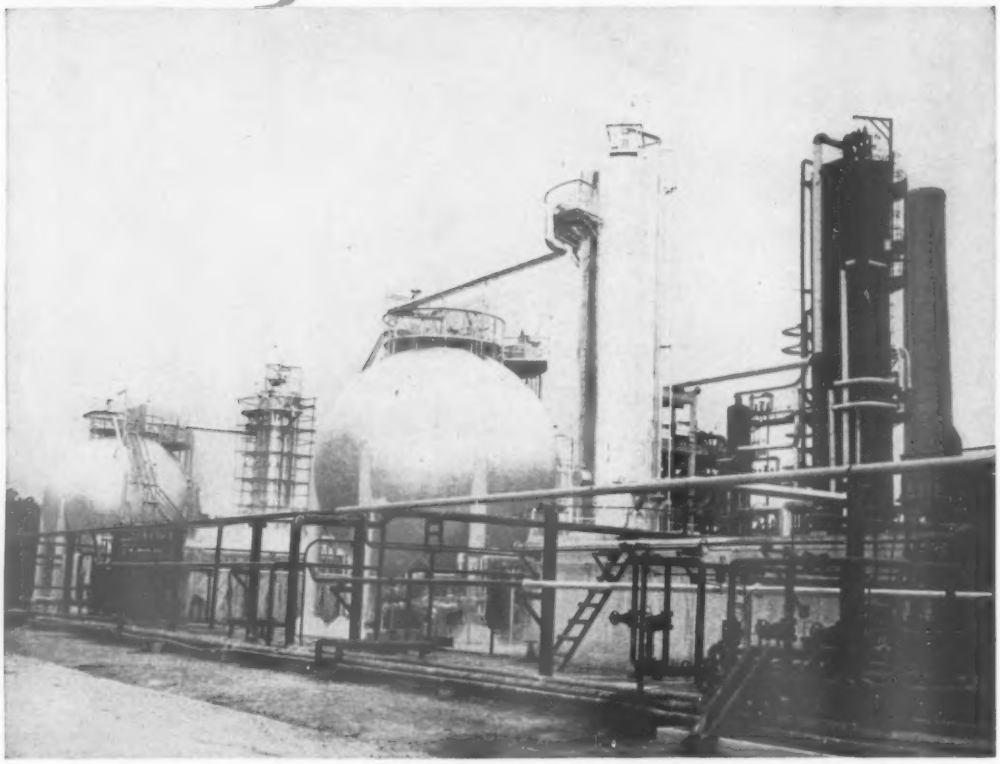
Only outboard-powered boats can get to Sun Oil Company's reservoir tanks in the Wabash bottoms!

FREE! Write for fully illustrated literature on the 4 versatile Johnsons for 1952—ranging from 3 hp to 25 hp. A size for every outboard need!

JOHNSON MOTORS, 6600 Pershing Road, Waukegan, Illinois
Johnson Motors of Canada, Peterborough

All hp is OBC Certified brake hp at 4000 rpm.

CITIES SERVICE } another leading refiner desalts with PETRECO



Cities Service has long been recognized for progressive leadership, dependable excellence of product and refining know-how. The first Petreco Desalter for Cities Service was installed in their East Chicago, Indiana, refinery. When their great new refinery at Lake Charles, Louisiana, was built, Petreco Desalters were installed as part of the regular refining flow system.

There is only one way to earn a *repeat* installation for a company such as Cities Service, and that is to produce results the first time. In this particular case the Petreco Electrosphere to the right in the picture above has delivered throughputs as high as 75,000 barrels per day for extended periods of time and was a considerable factor in the topping units continuous fifteen months run during which 30,000,000 barrels of oil were processed. Results such as these are the reasons why leading refiners continue to specify Petreco Desalting and Petreco Service.

PETRECO PROVIDES COMPLETE DESALTING SERVICE AND FACILITIES

PETRECO

SPECIALIZED Electric PETROLEUM PROCESSES { DESALTING / DEHYDRATING

Petrolite Corporation, Ltd.
PETRECO DIVISION
3202 South Wayside Drive, Houston 3, Texas
1390 East Burnett Street, Long Beach 6, California

BREWSTER N-3 DRAWWORKS FOR 3500' DRILLING

OVER 40 Years EXPERIENCE

The Brewster N-3 is a rugged, easily portable drawworks with a record of millions of feet of low-cost drilling. Available with single or double drum, the N-3 may be equipped with any popular make of engine of approximately 145 horsepower. The transmission has five forward speeds and one reverse speed. Controls are conveniently located at the driller's position and the N-3's simple design throughout makes it an easy drawworks to service.

BRAKES Self equalizing 6" by 42" full wrap brakes give an effective braking area of 1,080 square inches.

CHAINS Jack shaft drive chain is 1½" pitch double roller type. Drum drive chain is 2" pitch single roller. Rotary drive is 1¾" pitch single roller type.

SHAFTS Jack shaft diameter (maximum) is 3¼". Line shaft diameter is 3-11/16". Drum shaft is 5¼" maximum of 4140 alloy steel.

BEARINGS Anti-friction self-aligning roller type bearings of standard sizes are used on drum shaft, Jack shaft and line shaft.

FREE WHEELING DRUM ASSEMBLY Driven by twin disc friction clutch.

DRIVERS Driven by twin disc friction clutch.

THE BREWSTER COMPANY, INC.

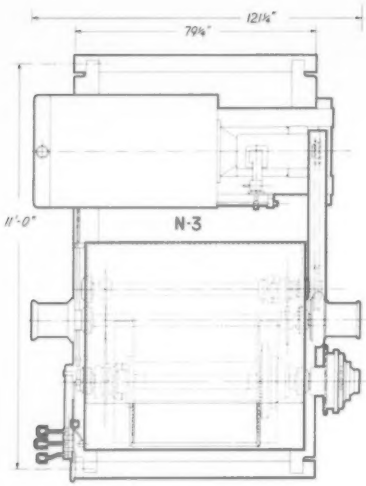
SHREVEPORT, LOUISIANA

BREWSTER DRILLING EQUIPMENT

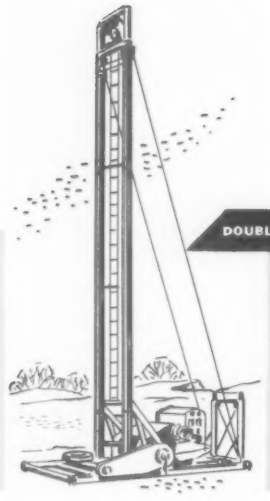
ASK YOUR NEAREST SUPPLY HOUSE TO TELL YOU ABOUT THE N-3 DRAWWORKS

Apex Equipment Company • Murray Brooks, Inc. • Reams Supply Company
Bovaird Supply Company • Industrial Supply Company • In Canada:
Rocky Mountain Supply Company—Direct and through recognized export dealers.

SPECIFICATIONS BREWSTER N-3 DRAWWORKS

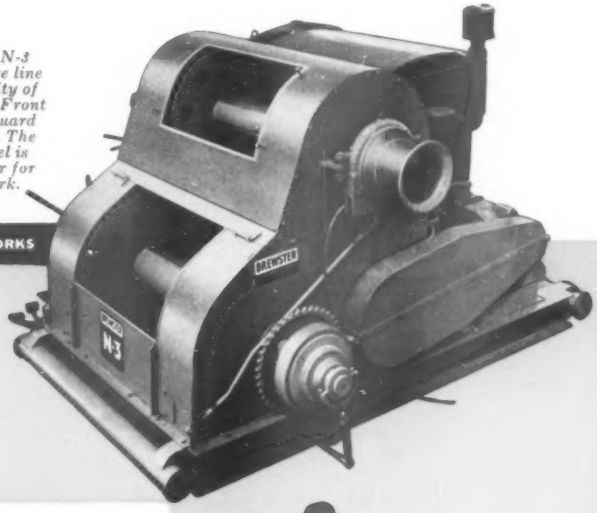


DIMENSIONS	SINGLE DRUM	DOUBLE DRUM
Over-all width	10' 8"	10' 8"
Over-all length	11' 6"	11' 6"
Skid size	10 x 8 WF	10 x 8 WF
Over-all height (with engine)	6' 8"	6' 10"
Weight (without engine)	14,000 lbs.	17,000 lbs.
	LOWER DRUM	UPPER DRUM
Spooling capacity	3500' of 1"	8000' of ⅝"
Flange diameter	42"	36"
Barrel diameter	12¾"	10¾"
Max. Shaft diameter	5¼"	4"
Clutch	Twin Disc E-124	Twin Disc E-2-18
Braking area	1388 sq. in.	1074 sq. in.
Brake Flange	6" x 42" Dia.	6" x 34¼" Dia.
Drive Chain	2" P. single	2" P. single



The double drum N-3 rig includes a wire line reel with a capacity of 8,000' of ⅝" line. Front section of drum guard is easily removed. The double drum model is extremely popular for well servicing work.

DOUBLE DRUM N-3 DRAWWORKS



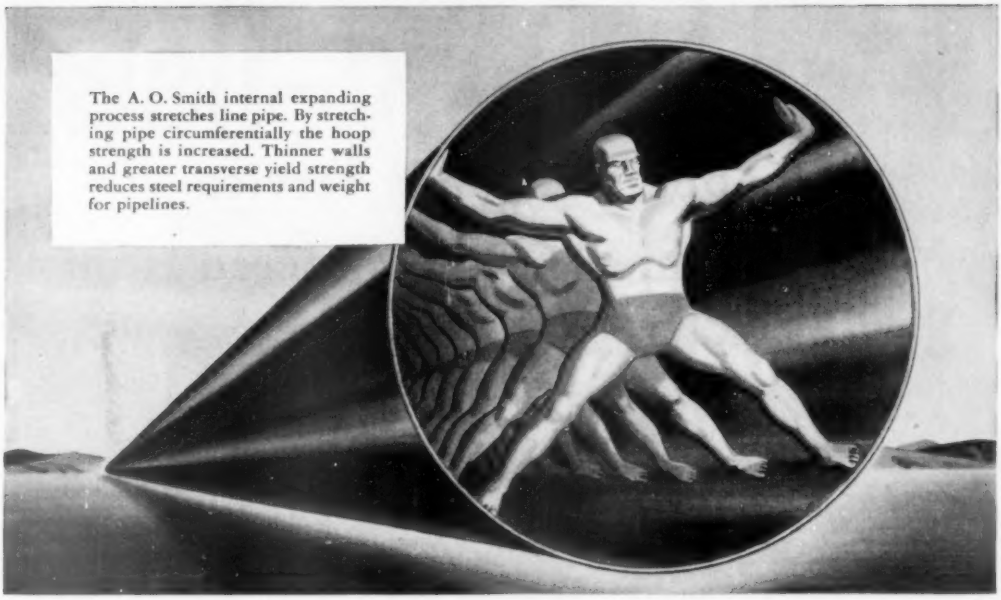
PULL AND SPEEDS	LOWER DRUM SPEED				
	1	2	3	4	5
Line Pull Lbs.	22,400	12,370	7,310	4,280	2,940
Line Speed Ft. per Min.	159	288	487	833	1,210
Rotary Sprocket Speed RPM	39	70	118	202	294
Line Shaft Speed RPM	58	105	178	303	442
	UPPER DRUM AND LINE SHAFT SPEED				
	1	2	3	4	5
Line Pull Lbs.	18,600	10,270	6,100	3,550	1,200
Line Speed Ft. per Min.	192	347	587	1,000	1,460
Line Shaft Speed RPM	58	105	178	303	442

LINE SPEEDS AND PULLS BASED ON SECOND WRAP ON DRUM 1" LINE ON LOWER DRUM — ½" LINE ON UPPER DRUM.

AUXILIARY EQUIPMENT

OB-18-L ROTARY • MODEL HT-50 HOOK BLOCK • 3-S OILBATH SWIVEL

FIRST names in pipelines depend on the FIRST* name in line pipe


The A. O. Smith internal expanding process stretches line pipe. By stretching pipe circumferentially the hoop strength is increased. Thinner walls and greater transverse yield strength reduces steel requirements and weight for pipelines.

We increase line-pipe Strength and Save Steel

The internal expanding of line pipe is a proven process at A. O. Smith Corporation. It has been used on SMITHway Line Pipe since 1930.

This stretches the pipe, increasing the circumferential yield strength as much as 30%. Lighter wall pipe can be used for the same operating conditions. Material savings in steel, freight, and field welding costs are obtained.

In these days of restrictions on the use of critical materials, of which steel is basic, the A. O. Smith internal expanding process, which assures uniformity of SMITHway Line Pipe, reduces the tonnage of steel required for any given pipe line.

Through its application of new and sound engineering design and developments in the manufacture of large diameter pipe, A. O. Smith is recognized as the leader in this field.

*FIRST® by A. O. Smith • Welded line pipe • Internal expanded pipe • Light wall large diameter pipe • World's largest producer of large diameter welded steel pipe.

DEPENDABILITY *through* **RESEARCH** *and* **ENGINEERING**

78th ANNIVERSARY 1874 - 1952

A.O.Smith

LINE PIPE • CASING

Chicago 4 • Dallas 2 • Denver 2 • Houston 2
Los Angeles 22 • Midland 5, Texas
New Orleans • New York 17 • Pittsburgh 19
San Francisco 4 • Seattle 1 • Tulsa 3
Washington 6, D. C. • International Division:
P. O. Box 2023, Milwaukee 1

Koppers expands service on American Hammered

Industrial and Aircraft Piston Rings

BECAUSE of the sale of its automotive replacement piston ring business Koppers now is in a position to further increase its leadership in piston and sealing rings for aircraft, general industrial, marine, commercial engine, railroad and oil field applications.

To present and prospective users of Koppers American Hammered Industrial Rings, this means increased engineering service, through concentrated attention to the solution of industrial and aviation ring problems; and greater production capacity for both original equipment and replacement rings. Our available manufacturing facilities include:

A large foundry equipped for both static and centrifugal casting . . . a modern heat-treating plant . . . one of the largest and most up-to-date chromium plating plants . . . modern machine shops . . . an efficient engine test laboratory . . . a modern and complete piston ring research laboratory.

In industrial and aviation rings, American Hammered *means* Koppers . . . builders of *engineered* products for industry.

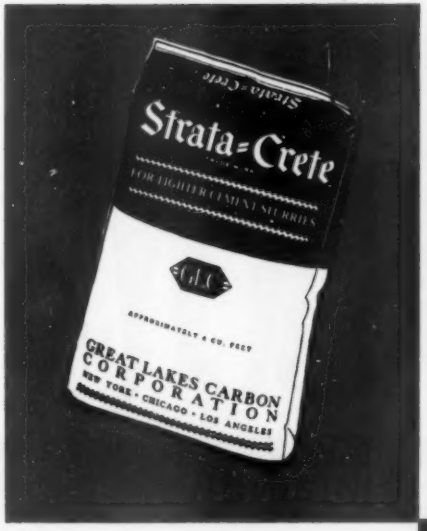
Write, wire or phone us for the right answer to your piston or sealing ring problems, today. KOPPERS COMPANY, INC., *Piston Ring Department*, 1556 Hamburg Street, Baltimore 3, Maryland.

KOPPERS

Koppers American Hammered Industrial Piston Rings

Only KOPPERS *can furnish K-Spun and Porous Chrome!*

well-proved



ability to solve drilling problems...

Strata-Crete
TRADE MARK
— the aggregate which provides lighter cement slurries with *excellent bridging qualities*

Strata-Seal
TRADE MARK
— the mud additive with *excellent bridging effect* for restoring lost circulation

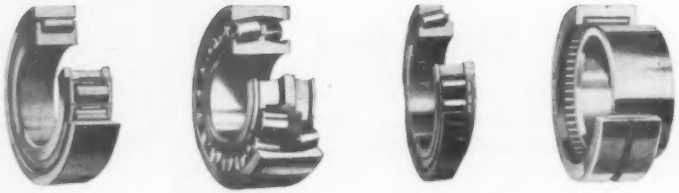
Lightweight STRATA-CRETE aggregate cuts down weight of cement slurries. It permits higher columns at lower pressures... bars loss of slurry... resists cracking or shattering on perforation.

Consistent performance in well after well gives *proof* that STRATA-SEAL is a superior lost circulation material. It is chemically inert and unaffected by mud or heat.

GREAT LAKES CORPORATION
a subsidiary of
GREAT LAKES CARBON CORPORATION
5845 Atlantic Ave., Long Beach 5, Calif.
Offices in Principal Oil Centers

Packed in 4 cu. ft. bags.
Available through Leading Oil Well Cementing Concerns; Leading Mud Service Companies.
Write for more data.

designed for harmony...



Torrington engineers have a thorough knowledge of the friction problems encountered in virtually every type of mechanical equipment. And they have had many years of experience with *all* types of anti-friction bearings. They are able to give sound, unbiased recommendations for the bearings best suited for the job at hand. Result: a harmonious blending of anti-friction bearing types with the products in which they are used.

Torrington engineers will be glad to help you—as they have many others—to select the bearings which will assure your products smooth, dependable operation.

THE TORRINGTON COMPANY
South Bend 21, Ind. Torrington, Conn.
District Offices and Distributors in Principal Cities of United States and Canada

TORRINGTON BEARINGS

Spherical Roller • Tapered Roller • Straight Roller • Needle • Ball • Needle Rollers

STAINLESS STEEL

ALUMINUM

NEED METALS?

INCONEL* BRASS NICKEL* COPPER STEEL MONEL*

Sheet, Plate, Tube, Pipe, Wire, Rod and Bar, Extrusions, Structural Shapes . . . and the following INDUSTRIAL PRODUCTS: Fasteners, Tube Fittings, Pipe Fittings, Valves, Silver Brazing Alloy, Welding Material, Solder, Castings, Tube Expander Equipment, Liquid Plastic Protective Coating, Metallic Caulking Compound, Aluminum Metal Trim, Waterproof Barriers, Nails, Handrail Fittings, Low Melting Alloys, Aluminum Jacketing, Wire Cloth and Rope, and "O" Rings.

Precision Equipment for Shearing and Slitting.

*Not stocked in Kansas City or St. Louis territories.

IN THIS AREA?

THEN CALL:

METAL GOODS CORPORATION

General Offices:
St. Louis 15, Missouri

†OFFICES AND WAREHOUSES

St. Louis 15, Missouri
5239 Brown Avenue
Nels Hower
Phone: GOodfellow 1234

Kansas City 16, Mo.
1300 Burlington
Frank D. Hogan
Phone: NOrclay 3516

Tulsa 3, Oklahoma
302 North Boston
Scott J. Harrison
Phone: 4-1175

Houston 3, Texas
711 Milby Street
Harris T. Gregg
Phone: CEntral 8881

Denver 2, Colorado
2425 Walnut Street
Cornelius C. Dehn
Phone: AComa 5891

Dallas 9, Texas
6211 Cedar Springs Rd
Sam D. Hodgdon
Phone: ELmhurst 3271

New Orleans 12, La.
432 Julia Street
Carl T. Wedemeyer
Phone: CAnal 7373

SALES SERVICE OFFICES

Jackson, Mississippi
781 Raymond Road
George E. Akerberg
Phone: 5-2711

Wichita, Kansas
2200 East Central
Ray Naller
Phone: 7-8921

Decatur, Illinois
1305 West Sunset
Arlie W. Tempel
Phone: 8-1314

Baton Rouge, Louisiana
4419 Mimosa Street
Paul P. Vidovic
Phone: 4-4738

Indianapolis 2, Ind.
Harry L. Newton
1333 N. Pennsylvania
Phone: Lincoln 4980

Davenport, Iowa
924 State Street
Robert L. Tharp
Phone: 2-3156

Omaha, Nebraska
3515 No. 67th Avenue
C. M. Cooley
Phone: Walnut 1112

Beaumont, Texas
238 Bowie Bldg.
L. T. Dodson
Phone: 4-7536, 4-7537

Fort Worth, Texas
3821 Carolyn
John M. Turbitt
Phone: FOrtune 4369

San Antonio, Texas
2012 Alamo Natl. Bldg.
Roy D. Bagaley
Phone: GArfield 3161

Memphis, Tennessee
713 Columbian Mutual Tower Bldg.
Robert W. Downs
Phone: 5-8721

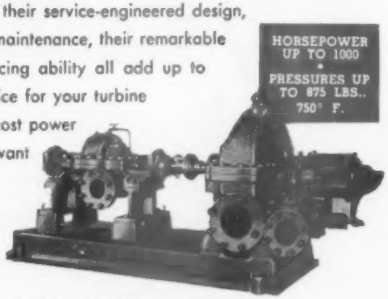
Call, wire, or write nearest Metal Goods Corporation Representative:

DEAN HILL STEAM TURBINES

are single stage, double impact type for low steam consumption. Specifically designed for operation at medium steam pressures and temperatures, DH Turbines have all the advantages available under these conditions, including excellent water rates. Get the full details and complete specifications. Write today.

POWERFUL "PENNY PINCHER"

Power a-plenty at a penny-pinching cost! That's how DEAN HILL STEAM TURBINES operate. Their super rugged construction, their service-engineered design, their low maintenance, their remarkable power-producing ability all add up to far more service for your turbine dollar. If it's low cost power you want . . . you want DEAN HILL STEAM TURBINES.



DEAN HILL PUMP COMPANY

Pump and Turbine Engineers Since 1895

INDIANAPOLIS 7, INDIANA

SALES OFFICES IN:

Chicago • Mexico City • Philadelphia • Salt Lake City • New York • Dallas • New Orleans • San Francisco • Denver • Los Angeles • Pittsburgh • Houston • St. Paul • Cleveland

No Question about a Reid vapor test when it's made with a Marsh Gauge

MARSH GAUGES

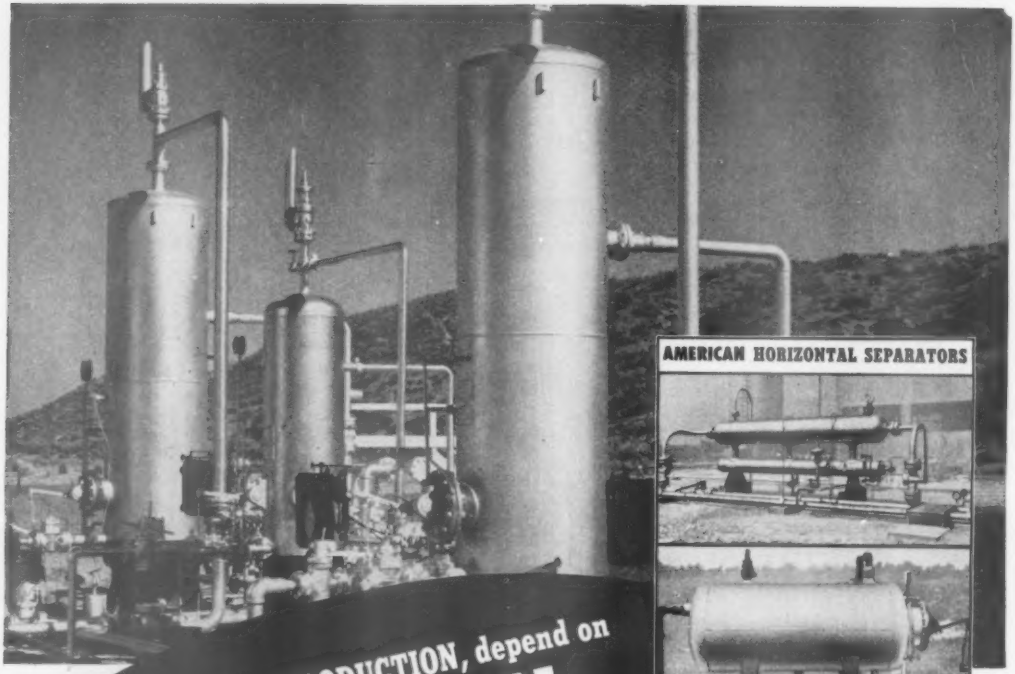
THIS REID VAPOR TEST GAUGE is a particularly forceful example of the care with which Marsh Gauges have been designed to meet specific conditions of every branch of the petroleum industry. It has every quality a gauge should possess for the Reid Vapor test—extreme accuracy, tight enclosure, ease of reading and convenience of handling.

The precision movement of this gauge is enclosed in a handsome sturdy, non-corrosive, vapor-proof case of tough Phenol Condensate . . . practically unbreakable; yet extremely light, as a gauge should be for this service. A red, hair-line pointer gives sharp readings on the clear scale. The built-in Marsh "Recalibrator"—easiest and best way to keep a gauge accurate—is an indispensable feature of this gauge in which maintained accuracy is so essential. That convenient, highly polished handle is the finishing touch to a finer testing instrument.

Marsh is the popular gauge for this service for the same reason that it is the preferred gauge for all petroleum services: because it is designed down to the last detail to fulfill a specific set of conditions supremely well.

Examine today's finer Marsh line at your supply house

MARSH INSTRUMENT CO., *Sales affiliate of Jas. P. Marsh Corporation*
Dept. L, Skokie, Illinois
Houston Branch Plant: 1121 Rothwell St., Sect. 15, Houston, Texas

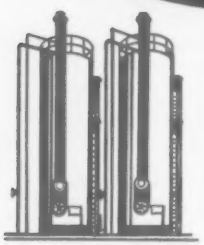


for IMPROVED PRODUCTION, depend on

AMERICAN NATIONAL

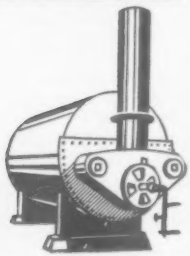
OIL & GAS SEPARATORS

EMULSION TREATERS • LINE HEATERS



AMERICAN-NATIONAL EMULSION TREATERS

These modern treating plants are scientifically engineered for maximum capacity and continuous duty operations. Dehydrated crude reduces corrosion, increases volume in tanks, pipe lines, refining plants.



AMERICAN-NATIONAL LINE HEATERS

These portable, automatic units meet your needs for either high or low pressure operation. Wide size range for any capacity gas or oil production.

Dependable American-National Oil & Gas Separators—vertical, or portable horizontal models—are built to meet your specific needs—in sizes, working pressures and capacities for most efficient production—under any of several construction codes, depending upon your preference and safety requirements. Behind every unit stands American's 46 year reputation for quality—and their 100% guarantee of materials and workmanship. Contact us today.

AMERICAN PIPE & STEEL CORPORATION

Engineers • Designers • Fabricators • Erectors

2201 West Commonwealth Avenue, Alhambra, Calif.

Cable address: AMPSTEEL

Bakersfield: U. S. Highway 99 & Casa Loma Dr.

Look to

SUPPLY BOVAIRD COMPANY

IF ANYBODY'S GOT IT
BOVAIRD HAS!

OFFICES AND STORES
ILLINOIS—Clay City, Claryville, Salem
KANSAS—Chase, Great Bend, McPherson, Pratt, Russell, Wichita
OKLAHOMA—Duncan, Oklahoma City, Paul's Valley, Kirkwood, Sapulpa, Sterling, Tulsa
TEXAS—Borger, Dallas, Midland, Odessa, Pampa, Snyder

"Buy From Bovaird"

THE *Bovaird* SUPPLY COMPANY
GENERAL OFFICES
TULSA, OKLAHOMA

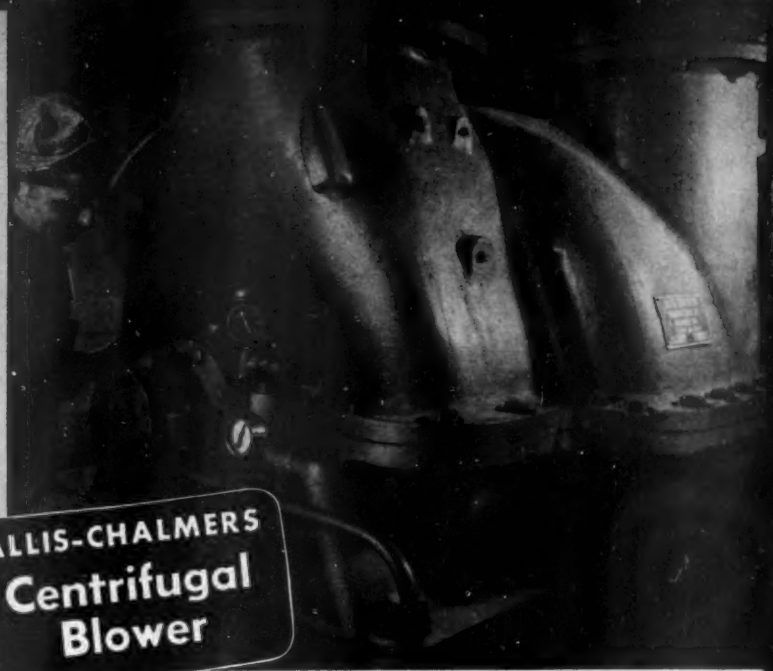
31 YEARS OF PROGRESS WITH THE OIL INDUSTRY

JONES SUCKER RODS

More operators are utilizing the valuable assistance available through Jones trained Field Engineers in selecting the right type rods and designing rod strings tailored to individual pumping conditions. Jones recommendations are based upon scientific facts backed by experience.

THE S. M. JONES COMPANY
Division of Buffalo-Eclipse Corporation
General Office and Factory: TOLEDO, OHIO
Sales Office: Kennedy Building, Tulsa, Okla.
Export Sales Office: Buffalo International Corp.
50 Church Street, N. Y. C.

LOOK FOR THE GREEN RODS



ALLIS-CHALMERS
Centrifugal
Blower

Supplies Air to New Houdriflow

ALL THE AIR NEEDED for catalyst regeneration *and* transportation in this new Houdriflow Catalytic Cracking unit is supplied by *one* Allis-Chalmers multi-stage centrifugal blower.

Put "on stream" in 1951, the unit is one of the many of its type already in operation. It is located in Blue Island, Ill. at the Great Lakes Refinery, a division of the Petco Corporation.

The new method extracts a higher percentage of gasoline from the crude and yet requires less equipment and instrumentation. The catalyst is both aerated and moved by the air from the one Allis-Chalmers multi-stage blower, rated 10,500 cfm at 12 psig. No mechanical means are required.

The blower and cracker operate 24 hrs a day, seven days a week, producing 6,000 bbls of gasoline per day. This particular refinery of the Petco Corporation has a daily capacity of 15,000 bbls and 300,000 bbls storage.

In the trend to more efficient cracking methods, the petroleum industry employs an ever-increasing number of centrifugal blowers. While one multi-stage blower is used in the Houdriflow process for two functions, other new cracking processes employ two single stage centrifugal blowers.

Your refinery expansion program also can benefit from Allis-Chalmers wide experience in building and applying blowing equipment in the petroleum industry. For more information or literature call your nearest A-C office or write Allis-Chalmers, Milwaukee 1, Wis. New Multi-Stage Bulletin 19B6104A is now available. A-3570

Texrope is an Allis-Chalmers trademark.

ALLIS-CHALMERS

Power, Electrical, Processing Equipment for Petroleum Industry

TURBINE-GENERATORS

BLOWERS and COMPRESSORS

TRANSFORMERS

UNIT SUBSTATIONS

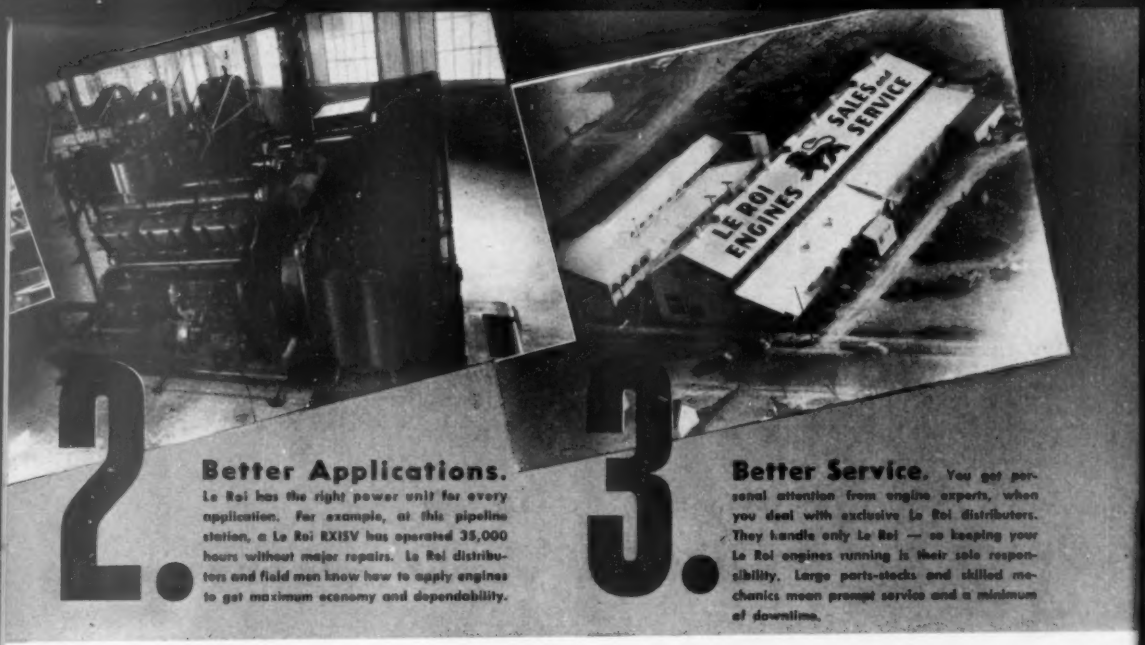
MOTORS—TEXROPE DRIVES-CONTROL

CENTRIFUGAL PUMPS

Le Roi 3 way Partnership

1. Better Engines. As one driller near Dennison, Texas puts it, "We never had any power unit like our Le Roi H540 for power and acceleration." The H540 is Le Roi's compact 135 HP V-8, one of three all-new designs brought out to provide better engines for the oil fields.

13,300′ in 122



2. Better Applications. Le Roi has the right power unit for every application. For example, at this pipeline station, a Le Roi RXISV has operated 35,000 hours without major repairs. Le Roi distributors and field men know how to apply engines to get maximum economy and dependability.

3. Better Service. You get personal attention from engine experts, when you deal with exclusive Le Roi distributors. They handle only Le Roi — so keeping your Le Roi engines running is their sole responsibility. Large parts-stocks and skilled mechanics mean prompt service and a minimum of downtime.

days! { with only two Le Roi L 3000's

Hall-Stewart's two-engine Le Roi L3000 rig has more than the 1950 drilling-depth record in West Texas to its credit. The Midland, Texas drilling contractor says this about his Le Roi's:

"We're now drilling our sixth 13,000-foot well. That's hard work on any engine, but we think our Le Roi's are 'just getting broken in'.

"We find that Le Roi L3000's are faster on acceleration — and have more pep — than slower, in-line engines.

"Ever since we've had our first Le Roi engine, service from General Machine & Supply Co. (West Texas Le Roi distributor) has been excellent. Their overhaul work is superior to any other shop. And they get a man out faster, when we need him.

"Repairs cost less, too. We figure 25% less for overhaul than with other engines."

Le Roi drilling engines range from 155 to 600 max. hp. They operate on abundant, low-cost oil-field fuels — natural gas or butane — and can be switched from one to another in an instant.

On original equipment or as replacement engines, Le Roi power puts you ahead of the field. Contact your nearby distributor or Le Roi Oil Field Headquarters for details of Le Roi's 3-way Partnership.

LE ROI COMPANY

MILWAUKEE 14, WISCONSIN

Plants: Milwaukee • Cleveland • Greenwich, Ohio
Oil Field Headquarters: Tulsa, Oklahoma

See these Le Roi Distributors for a Profitable 3-way Partnership or contact your favorite supply house

Oklahoma
Le Roi Company Branch — Tulsa
Carson Machine & Supply Co.— Oklahoma City

East & South Texas, Gulf Coast
Southern Engine and Pump Company — Houston, Kilgore, Edinburg, Dallas, San Antonio, Corpus Christi, Texas, and Lafayette, Houma, Louisiana.

North & West Texas, New Mexico
General Machine & Supply Co. — Odessa, Snyder, Texas.
Nortex Engine & Equipment Co.—Wichita Falls, Texas.

Kansas
Carson Machine and Supply Co.—Great Bend

Illinois — Western Kentucky
Western Machinery & Engine Company — Centralia, Illinois and St. Louis, Missouri.

Michigan
Hafer Engine Service — Reed City

Rocky Mountain Area
Gehring Equipment Co. — Casper, Wyoming, Rangeley, Col.

Mississippi, Arkansas and Northern Louisiana
Ingersoll Corporation — Shreveport, Louisiana, Jackson, Mississippi, El Dorado, Arkansas

West Coast
Le Roi-Rix Machinery Co. — Los Angeles, Long Beach and Bakersfield, Calif.

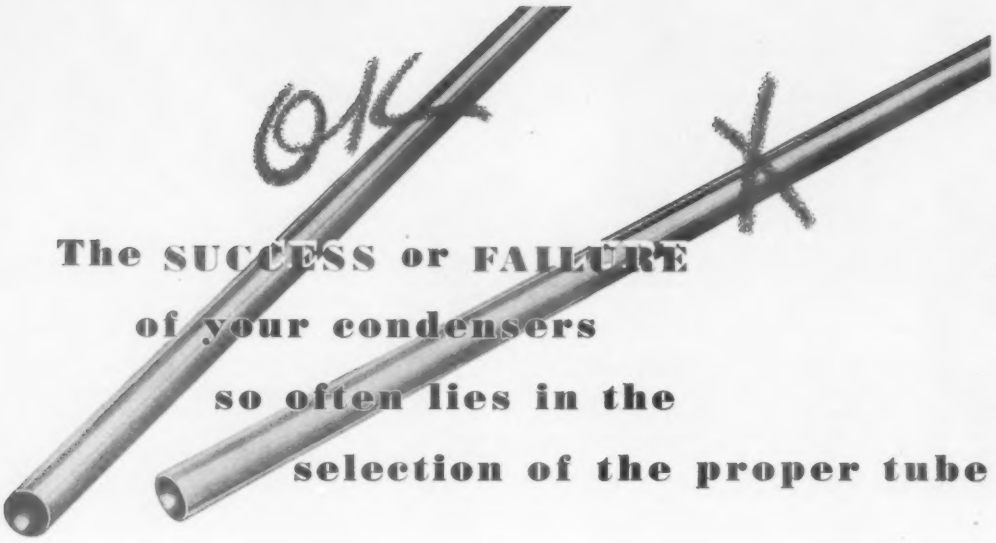
Appalachian Area
P. C. McKenzie Co., Pittsburgh, Bradford.

Canada
Lucey Export Ltd. — Calgary, Edmonton, Alberta.

P-115

A Typical Le Roi Service Facility

Here's the efficient well-arranged parts department of the Le Roi-Rix Co.'s Long Beach branch. Two more offices—at Bakersfield and Los Angeles—are similarly equipped. All three offices maintain prompt 24-hour service. Le Roi has service facilities like these throughout the oil fields — another reason why you can depend on Le Roi.



The SUCCESS or FAILURE of your condensers so often lies in the selection of the proper tube

After all, a tube — or actually a quantity of tubes — is charged with a large share of a condenser's function. Because so much depends upon the physical ability of the tube to "carry on", the selection of the tube—the right tube—is indeed of great importance.

When you select your tube, make sure it is of the proper copper base alloy to meet the conditions that prevail in your particular operations.

If you are not absolutely certain of the right alloy to use, or if you are interested in checking up on the latest developments in tubes for condenser operations — and to learn about some of our laboratory findings — we invite your correspondence.

WOLVERINE TUBE DIVISION
Calumet & Hecla Consolidated Copper Company
INCORPORATED
Manufacturers of seamless, nonferrous tubing
Central Avenue • Detroit 9, Michigan

PLANTS IN DETROIT, MICHIGAN AND DECATUR, ALABAMA
Sales Offices in Principal Cities
Export Department, 15 E. 40th St., New York 16, N. Y.

1. GENERAL MANAGER, 2. AUDITOR, 3. PROJECT ENGINEER, 4. RESEARCH ENGINEER, 5. PROCUREMENT ENGINEER, 6. MANAGER OF CONSTRUCTION, 7. PERSONNEL MANAGER, 8. PLANNING AND SCHEDULING ENGINEER, 9. SALES MANAGER.

In the BIG LEAGUES it's TEAM-WORK that counts

Although the stars on the Chemical Plant's team are not publicized, the roster is made up of engineers and other specialists having outstanding performance records. Chemical Plants Division is staffed to "take over" tentative plans and see the job through to completion with competence, speed and economy. Whether the project calls for a packaged gasoline plant, an addition to your present facilities or the construction of a complete process plant ready for operation, Chemical Plants is interested in playing ball with you.

CHEMICAL PLANTS DIVISION

BLAW-KNOX CONSTRUCTION COMPANY
120 East Ninth Street, Tulsa 1, Oklahoma
Pittsburgh 22 • New York 7 • Chicago 3 • Philadelphia 3 • Birmingham 3
Washington 5, D. C.

AXELSON

HYDRAULIC LONG STROKE PUMPING UNIT

PROFIT PRODUCING ADVANTAGES TO THE PETROLEUM OPERATOR:

- Increased stroke length
- Fewer stroke cycles per minute
- More production with greatly reduced rod trouble
- Less down time
- Performance proved

AN AXELSON ENGINEER IS AT YOUR SERVICE FOR DISCUSSION OF ANY SPECIFIC PUMPING PROBLEM WHICH YOU MAY HAVE.

The necessity for long stroke pumping is the result of the ever increasing depths of wells which must be artificially produced. These deeper wells, high-volume wells, and other wells where frequent sucker rod breaks are a constant problem, are ideally suited for more profitable pumping with the Axelson Long Stroke Pumping Unit.

AXELSON

PETROLEUM PUMPING EQUIPMENT

OUR 60th YEAR

THERE IS NO ECONOMICAL SUBSTITUTE FOR QUALITY

AXELSON MANUFACTURING CO. • 6160 SOUTH BOYLE AVENUE • P. O. BOX NO. 15335, LOS ANGELES 58, CALIFORNIA

CHEVROLET Advance-Design TRUCKS

Buy on these plain, hard FACTS!

CHEVROLET first in demand in value in sales

Fact No. 1

COSTS LESS TO BUY

Payload pound for payload pound, a Chevrolet truck *lists for less* than any other truck with the qualifications to handle your job. As the world's largest manufacturer of trucks, Chevrolet takes advantage of production economies to pass substantial savings on to you!

Fact No. 2

SAVES MONEY ON THE JOB

Chevrolet trucks save you money over the miles with great proved features that cut costs. Valve-in-Head economy, rugged Hypoid rear axles, extra-sturdy channel-type frames and Flexi-Mounted cabs, Ball-Gear Steering, Synchro-Mesh Transmission.

Fact No. 3

RIGHT TRUCK FOR EVERY LOAD

Your first interest in a truck is: "How well will it do the job?" That's where Chevrolet trucks have it, because they're factory-matched to the payload—tires, axles, frame, springs, engine, transmission, brakes. You get as much truck as your job calls for.

Fact No. 4

KEEPS ITS VALUE LONGER

Chevrolet trucks traditionally keep their value longer to bring higher used truck prices, year after year, at trade-in time. That means real, substantial dollar-and-cents savings when you wish to replace your present truck with a new one.

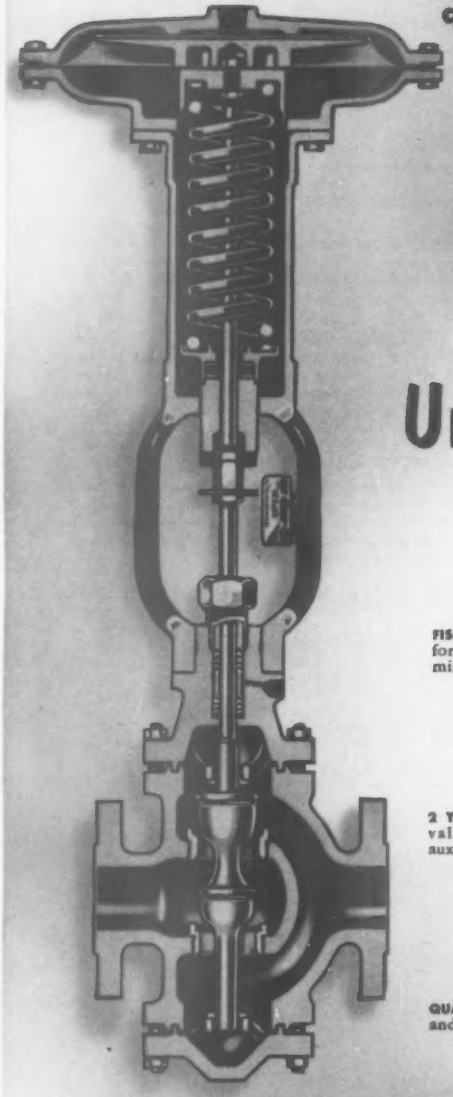
CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load • POWER-JET CARBURETOR—for smooth, quick acceleration response • DIAPHRAGM SPRING CLUTCH—for easy-action engagement • SYNCHRO-MESH TRANSMISSION—for fast, smooth shifting • HYPOID REAR AXLE—for dependability and long life • TORQUE-ACTION BRAKES—on light-duty models • PROVED DEPENDABLE DOUBLE-ARTICULATED BRAKES—on medium-duty models • TWIN-ACTION REAR BRAKES—on heavy-duty models • DUAL-SHOE PARKING BRAKE—for greater holding ability on heavy-duty models • CAB SEAT—with double-deck springs for complete riding comfort • VENTI-PANES—for improved cab ventilation • WIDE-BASE WHEELS—for increased tire mileage • BALL-TYPE STEERING—for easier handling • UNIT-DESIGNED BODIES—for greater load protection • ADVANCE-DESIGN STYLING—for increased comfort and modern appearance.

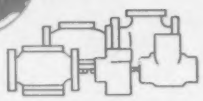
CHEVROLET DIVISION OF GENERAL MOTORS, DETROIT 2, MICHIGAN

Exclusive features of design plus quality controlled materials and workmanship are the reasons

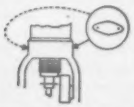
FISHER®
Diaphragm Motor Valves are Universally Preferred



FISHER ALLOY SPRINGS are tested for load tolerances of plus or minus 2½%.



VARIETY OF BODY TYPES and materials—iron, steel, bronze, alloys, single and double seated, angle and globe.



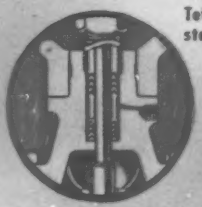
2 YOKE MOUNTING PADS for valve positioner and other auxiliary equipment.

WIDE CHOICE OF INNER VALVES to provide desired flow characteristics.

QUALITY CONTROLLED materials and workmanship.

WALL SECTIONS conform with ASA fittings code.

Fisher offers the most versatile and complete line of Diaphragm Motor Valves—manufactured to handle pressure conditions up to 6,000 pounds. Available in metals for highly corrosive service and alloys for high temperature work. They are built for your specific requirements.



VERSATILE! ECONOMICAL!

Teflon V-Ring Packing, requiring no lubrication, is standard on all Fisher Diaphragm Motor Valves

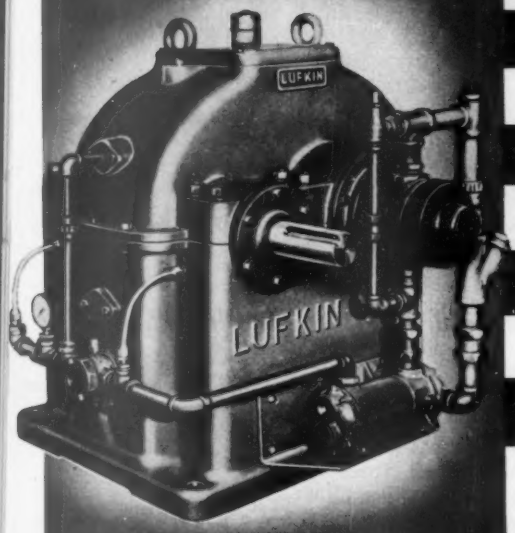
Dual Teflon packing also available. 2 sets of packing separated with bleed area where purge zone is desired. Positively prevents outbound leakage—or inbound leakage under vacuum service. For dangerous toxic, corrosive, etc. applications.

FISHER

FISHER GOVERNOR COMPANY • Marshalltown, Iowa

LEADS THE INDUSTRY IN RESEARCH FOR BETTER PRESSURE CONTROL

Lufkin



LUFKIN, TYPE N "HIGH SPEED"

HERRINGBONE GEAR SPEED REDUCERS AND INCREASERS

ANY SIZE
3 TO 2000 H. P.

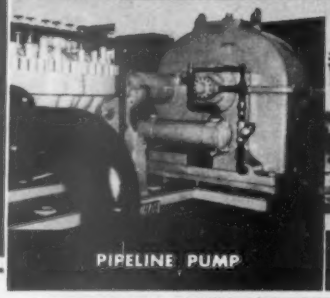
ANY SPEED
0 TO 12,000 R. P. M.

ANY RATIO
1 TO 1 TO 70 TO 1

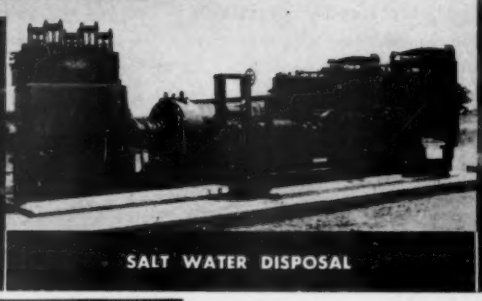
ANY JOB

WHERE SPEED IS REDUCED OR INCREASED . . . . . .

Eighty Different Sizes From Which To Choose



PIPELINE PUMP



SALT WATER DISPOSAL

ALSO SPIRAL BEVEL REDUCERS FOR COOLING TOWERS

LUFKIN FOUNDRY & MACHINE COMPANY

LUFKIN, TEXAS

Branch sales and service Houston, Dallas, New York, Tulsa, Los Angeles, Seminole, Oklahoma City, Corpus Christi, Odessa, Kilgore, Wichita Falls, Casper, Wyoming, Great Bend, Kansas

Lufkin Equipment in CANADA is handled by

THE LUFKIN MACHINE CO., LTD. 14321 108th Avenue, Edmonton, Alberta, Canada.

LUFKIN PUMPING UNITS

LUFKIN-CASPER-REDUCER GEARING

LUFKIN OIL FIELD AND INDUSTRIAL GEARED TRANSMISSIONS

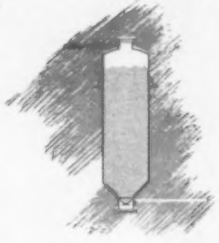
INDUSTRIAL SPEED REDUCERS AND INCREASERS

LUFKIN FOUNDRY & MACHINE COMPANY INDUSTRIAL MILL AND AUTOMOTIVE SUPPLIES

...two reliable names along the path of petroleum processing

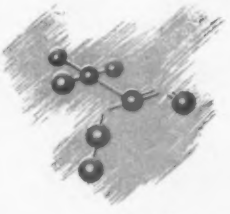
WHAT DO YOU WANT TO PURIFY?

There's an Attapulgus or Porocel adsorbent to fit your process technique for removing odors, colors, tastes, moisture, acids, sulfur, fluorides and unsaturates from process liquids or gases. Materials treated in principal applications are: motor oils and other lubricating, specialty, and technical oils; petrolatums and waxes; aviation and motor gasoline stocks; kerosene; diesel and heating oils.



DO YOU HAVE CATALYST OR CATALYST CARRIER NEEDS?

Attapulgus or Porocel sorptive minerals are recognized standards in desulfurization, reforming and isomerization systems—catalytic removal of unsaturates—conversion of sulfides to elemental sulfur—fluid catalyst applications—as catalyst carrier in copper sweetening processes.



WHAT DO YOU WANT TO DRY?

We offer a wide range of reliable, thoroughly proved desiccants for drying air, hydrogen, carbon dioxide, hydrocarbon liquids and gases.

SPECIAL GRADES?

Mine and plant facilities permit prompt and economical production of grades meeting individual customer specifications. Our laboratories and technical staffs welcome the opportunity of assisting in research, development, design and operating problems. Your inquiries are invited.

ATTAPULGUS CLAY COMPANY *Fullers Earth* · **POROCEL** CORPORATION *Activated Bauxites*

Dept. V, 210 West Washington Square, Philadelphia 5, Pa.

WHELAND

HP-8000 7¼" x 12"
delivers 577 GPM at 555 PSI with 7¼" liners to 322 GPM at 995 PSI with 5½" liners at 70 RPM.

220 INPUT HORSEPOWER

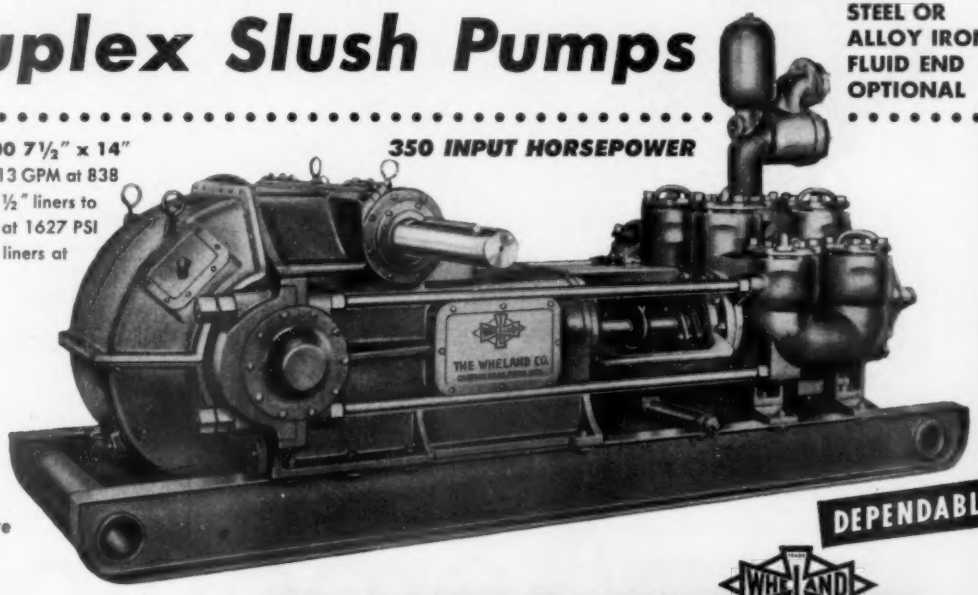
MORE PRESSURE—MORE MUD

Duplex Slush Pumps

STEEL OR ALLOY IRON FLUID END OPTIONAL

HP-14000 7½" x 14"
delivers 613 GPM at 838 PSI with 7½" liners to 316 GPM at 1627 PSI with 5½" liners at 60 RPM.

350 INPUT HORSEPOWER



Write for descriptive bulletin

DEPENDABLE

WHELAND

THE WHELAND COMPANY, CHATTANOOGA, TENN., U. S. A.
ROTARY DRILLING MACHINERY

DRAWWORKS • SLUSH PUMPS
ROTARIES • CROWN BLOCKS
TRAVELING BLOCKS • SWIVELS

DOMESTIC DISTRIBUTORS & THEIR HEADQUARTERS: Jones & Laughlin Supply Co., Tulsa, Oklahoma • Houston Oil Field Material Co., Inc., Houston, Texas
Iverson Supply Co., Tulsa, Oklahoma • Lucey Products Corporation, Tulsa, Oklahoma • Superior Iron Works & Supply Co., Inc., Shreveport, Louisiana
EXPORT DISTRIBUTOR: Lucey Export Corporation, 233 Broadway, New York 7, New York — Broad Street House, London E. C. 2, England

AEROQUIP SELF-SEALING COUPLINGS

AND FLEXIBLE HOSE LINES

BUSES AND TRUCKS

RAILROADS

OIL FIELD DRILLING RIGS

MACHINE TOOLS

MATERIALS HANDLING TRUCKS

Speed Maintenance

WHEREVER FLUID-CARRYING LINES
MUST BE DISCONNECTED AND RECONNECTED

Speed maintenance, *speed* repair operations and *speed* interchanging of accessories joined by fluid-carrying lines with Aeroquip Self-Sealing Couplings. Lines may be separated in a few seconds without loss of fluid. No air enters the system upon reconnection. There is no need to drain or prime the fluid system. One Self-Sealing Coupling takes the place of two shut-off valves.

Aeroquip

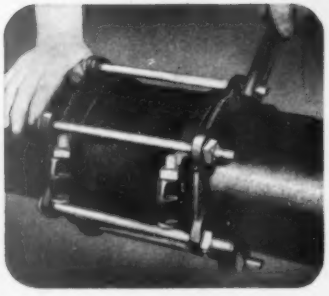
REG. TRADE MARK

AEROQUIP CORPORATION, JACKSON, MICHIGAN

SALES OFFICES: BURBANK, CALIF. • DAYTON, OHIO • HAGERSTOWN, MD. • HIGH POINT, N. C. • MIAMI SPRINGS, FLA.
MINNEAPOLIS, MINN. • PORTLAND, ORE. • WICHITA, KAN. • TORONTO, CANADA

AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD

FOR THREAD LEAKS AT FITTINGS



FOR EVERY TYPE OF COLLAR LEAK

SKINNER-SEAL COLLAR LEAK CLAMP, with its sealed gasket and massive construction, stops every type of collar leak.

SKINNER-SEAL PIPE JOINT CLAMP stops leaks at joints where pipe is screwed into a fitting. Any temperature — pressures up to 2,000 pounds. A permanent repair — it saves the cost of tearing out and renewing leaky fittings. Prevents shut-downs. This clamp, constantly improved over the years, has been serving the industry for over half a century. In stock at all oil supply stores!

M. B. SKINNER COMPANY, SOUTH BEND 21, IND., U. S. A.

PIPE JOINT CLAMP
COLLAR LEAK CLAMP

SKINNER-SEAL

FEATURE FOR FEATURE...

DRY CHEMICAL

C-O-TWO

FIRE EXTINGUISHERS

are your best buy!

● These fast, positive fire killers are easy to operate, compact, well-balanced and offer extensive maneuverability indoors or outdoors... no extra gadgets protruding or complicated operating parts. The outstanding mechanical breakage feature of C-O-TWO Dry Chemical Type Fire Extinguishers, plus continuous inert gas pressured agitation or fluffing, together with a skillfully blended free flowing dry chemical guarantee lasting, foolproof fire protection. All sizes are rechargeable on-the-scene by anyone... no special tools required.

C-O-TWO Dry Chemical is a finely pulverized powder... non-conducting, non-corrosive, non-abrasive, non-freezing and non-toxic... special compound consists of sodium bicarbonate and other chemicals skillfully blended to render high fire extinguishing qualities, remain free flowing while being used and withstand long periods of storage without deterioration. When brought into contact with fire, C-O-TWO Dry Chemical absorbs a greater part of the heat, decomposes and releases fire killing gases. This heat absorption process acts as an insulating screen for the fire fighter.

Fully approved and built to rigid specifications... C-O-TWO Dry Chemical Type Fire Extinguishers are exceedingly effective on flammable liquid, gas and electrical fires, as well as surface fires involving ordinary combustible materials... rated by Underwriters' Laboratories, Inc. and Factory Mutual Laboratories for class B and C fires.

Convenient 4, 20 and 30 pound hand sizes... no syphon tubes or valves within the cylinder to become clogged or inoperative... discharge hose and squeeze type discharge nozzle remain empty until actuation takes place... one piece removable top assembly.

Also, convenient 150 pound wheeled size... sturdy, wide-faced wheels... discharge hose and two position discharge nozzle having soft or solid stream fully enclosed in protection casing... footrail and dual bar handle provide easy inverting.

Act now for complete free information on these top quality fire extinguishers. Remember... you can't put fire off... fire doesn't wait. Get the facts today!

exclusive inverting design renders constant free flowing dry chemical, assuring faster, more effective and complete discharge

C-O-TWO FIRE EQUIPMENT COMPANY

NEWARK 1 • NEW JERSEY

Sales and Service in the Principal Cities of United States and Canada

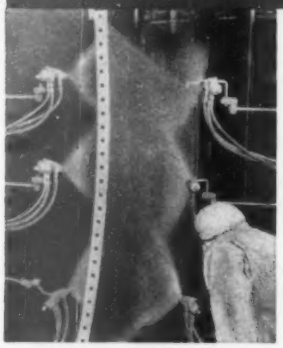
Affiliated with Pyrene Manufacturing Company

MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT

Squeez-Grip Carbon Dioxide Type Fire Extinguishers • Dry Chemical Type Fire Extinguishers • Built-In Smoke and Heat Fire Detecting Systems
Built-In High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems

Your Best Long-Term Buy Is Butler

BOLTED STEEL OIL TANKS • WALKWAYS AND STAIRWAYS



Each tank gets better, more uniform surface protection because of Butler electrostatic paint spray equipment. This 2-coat bond helps resist corrosion, adds longer life to the tank.

Butler Bolted Tanks . . . Walkways and Stairways . . . are your best long-term buy because the extra care and skill that Butler puts into engineering and fabrication give you extra years of service.

Each Butler tank sheet is die formed and all parts are precision made and punched for an oil-tight fit and easier erection. A.P.I. specifications on all tanks from 100 to 10,000 barrel capacities.

Remember that Butler is your best long-term buy. See your Butler Distributor.

You'll Always Get Dependable Service from Your Butler Distributor

Your Butler distributor will give you dependable service on Butler Bolted Steel Tanks, Walkways and Stairways, Unit Heaters and other oil field equipment.

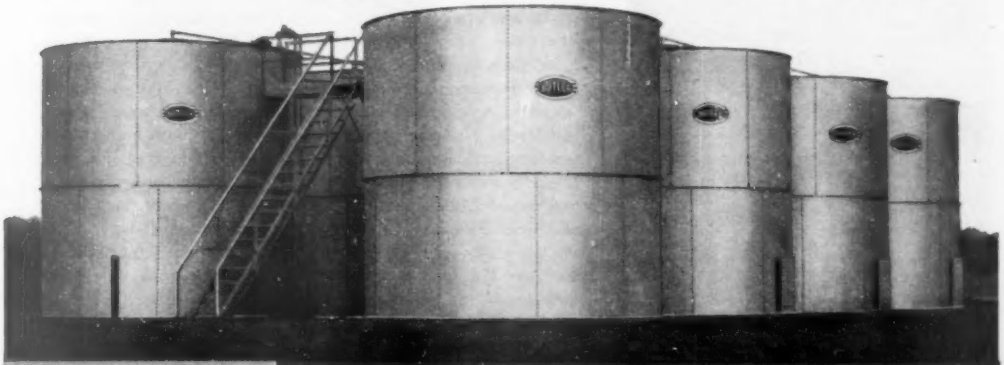
AMERICAN PIPE & SUPPLY COMPANY
Casper, Wyoming · Denver, Colorado · Cut Bank, Montana

HARRY G. MILLER
El Dorado, Arkansas

UNION TANK & SUPPLY COMPANY

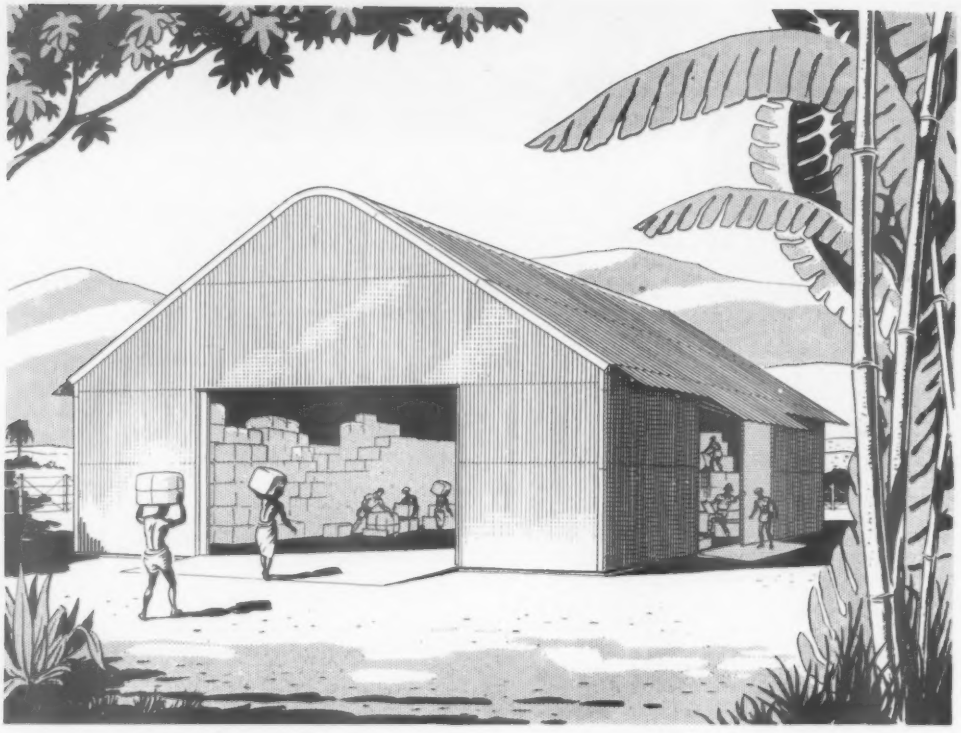
Fort Worth, Texas	Alice, Texas	Abilene, Texas	Great Bend, Kansas
Houston, Texas	Tyler, Texas	LaFayette, La.	Tulsa, Okla.
Odessa, Texas	Midland, Texas	Ruston, La.	Oklahoma City, Okla.
Snyder, Texas	Nocona, Texas	New Orleans, La.	Hobbs, New Mexico

W. H. CONNOR, INC.
Denver, Colorado · Sterling, Colorado · Casper, Wyoming · Powell, Wyoming



BUTLER STEEL PRODUCTS

BUTLER MANUFACTURING COMPANY
KANSAS CITY, MO.
Galesburg, Ill. · Richmond, Calif. · Birmingham, Ala. · Minneapolis, Minn.



'Arcon' built—and a 'special' for Space!

(1) *A labour force of eight unskilled men can easily put up the framework of an 'Arcon' 3-bay Storage Building in approximately 27 hours.*

(2) *The walls and roof are made of durable, corrugated asbestos cement sheeting, which is easy to fit. 'Arcon' doors and windows can be inserted where needed; transparent corrugated sheets ("Perspex") may also be fitted as desired.*

(3) *This is the finished 'Arcon' Storage Building; its form of construction makes it easy to extend or modify to meet changing requirements.*

'Arcon' Storage Buildings are proving their worth all over the world. A case in point is the use of such a building for Customs and loading sheds in harbour development in Australia. Point by point the 'Arcon' Structure suited all requirements perfectly; it could be erected at short notice by unskilled men with the minimum of specialist supervision; it provided ample space which could be made larger still, if necessary, by simply adding extra bays on the principle of 'Arcon' flexible planning; and finally, the finished 'Arcon' Storage Building would be strong, fireproof, and indeed almost indestructible equally suitable for a warehouse, machine-shop, or for meeting a variety of accommodational needs. We have also supplied this type of building for use as garages in Burma and the Sudan; whilst a further successful application has been proved in West Africa, where the 'Arcon' Storage Building was supplied to construct a native market.

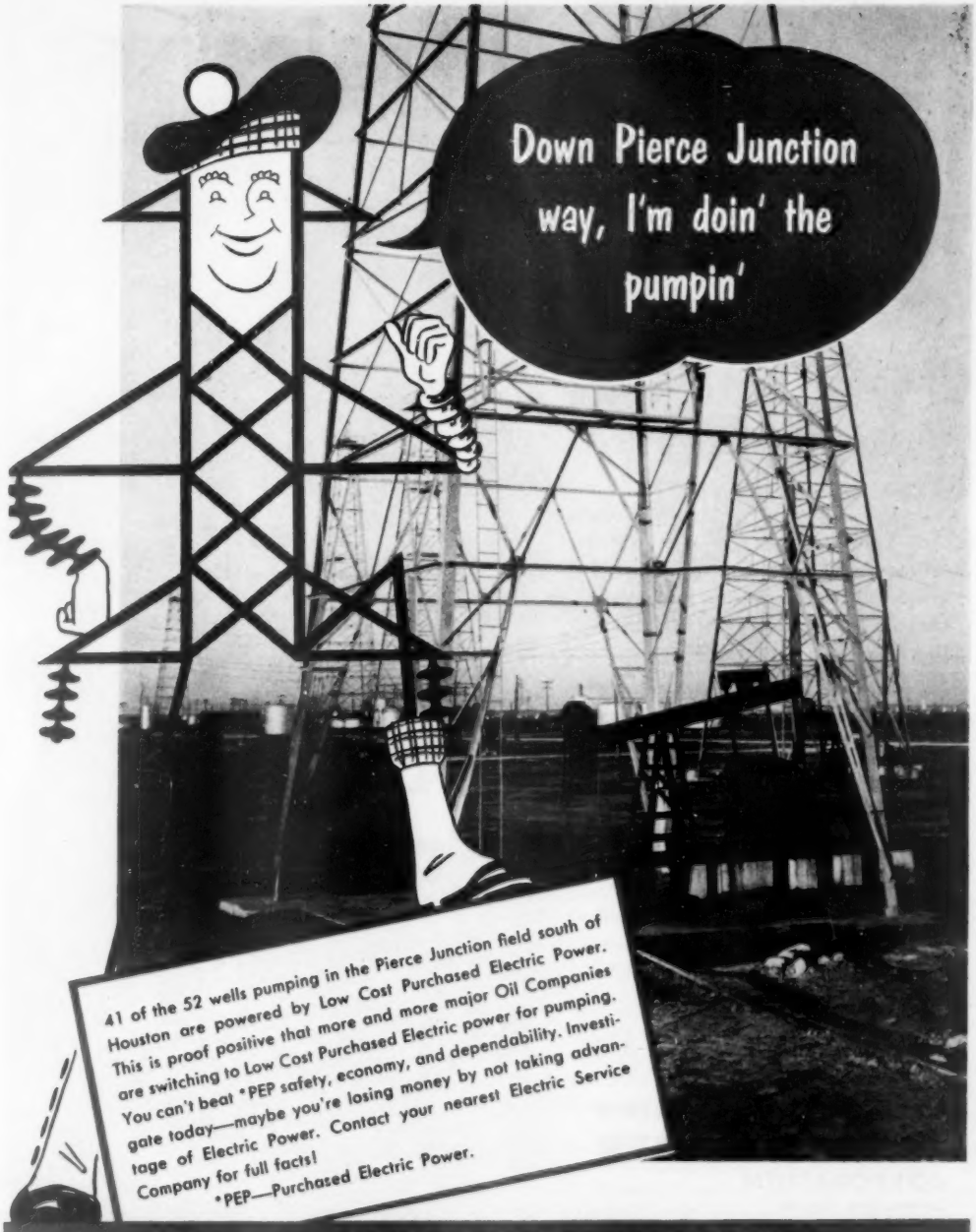
We will gladly send you our free brochure giving you full details of the 'Arcon' Storage Building. You will be able to see clearly how well 'Arcon' can answer *your* needs.

'ARCON' *Structures*

Write to:

TAYLOR WOODROW (BUILDING EXPORTS) LTD

41 WELBECK STREET · LONDON W.1 · ENGLAND


Down Pierce Junction way, I'm doin' the pumpin'
41 of the 52 wells pumping in the Pierce Junction field south of Houston are powered by Low Cost Purchased Electric Power. This is proof positive that more and more major Oil Companies are switching to Low Cost Purchased Electric power for pumping. You can't beat *PEP safety, economy, and dependability. Investigate today—maybe you're losing money by not taking advantage of Electric Power. Contact your nearest Electric Service Company for full facts!
*PEP—Purchased Electric Power.

Petroleum Electric Power Association

ORGANIZED IN THE INTEREST OF GREATER SERVICE TO THE PETROLEUM INDUSTRY

CALL YOUR NEAREST ELECTRIC SERVICE COMPANY FOR MORE FACTS

OR ADDRESS YOUR REQUEST TO P. O. BOX 2771, DALLAS, TEXAS

P&H Diesel Engines

(2-CYCLE)

Can you do this with your diesels?

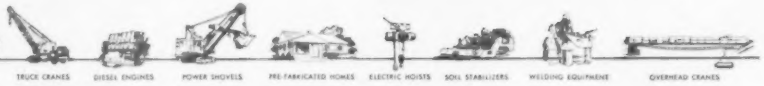
Within just 40 minutes you can remove a cylinder assembly — replace it with a complete new one — and have your P&H Diesel back in service.

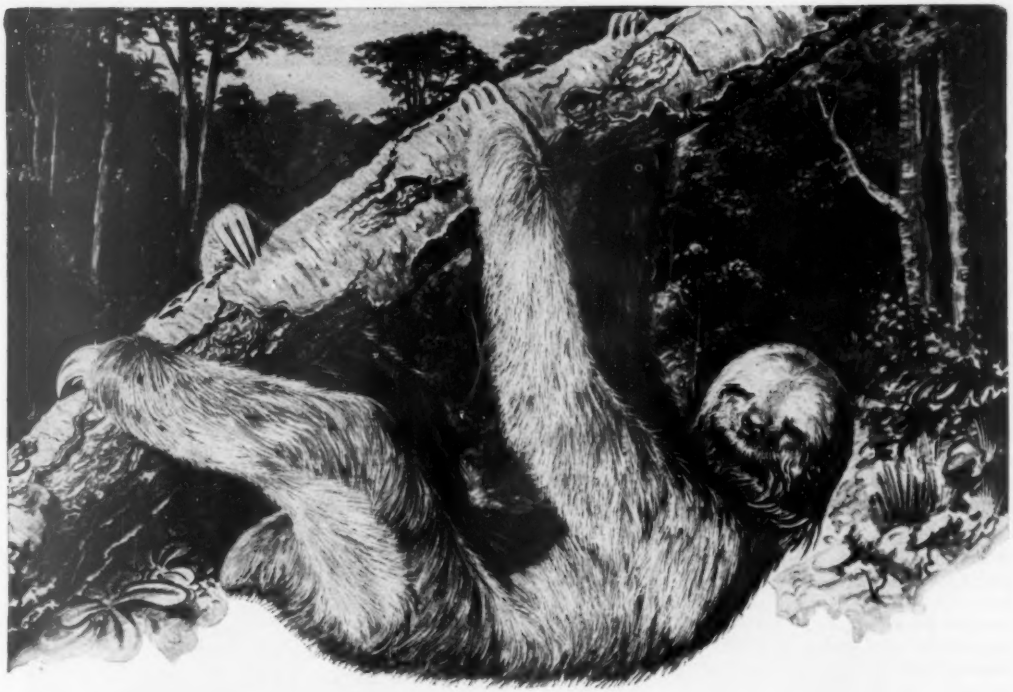
No other diesel offers you such amazing speed and simplicity — such protection against costly lay-ups. Think what it can mean to you in time and cost savings — in simpler parts stocks. Where necessary, you can take an assembly from one engine to another . . . good reason in itself for standardizing on P&H Diesels.

This is only one of many advantages you'll find in this advanced line of P&H Diesels. Ask your nearest P&H Diesel representative for complete facts. Or write us.

P&H DIESEL DIVISION
HARNISCHFEGER CORPORATION
CRYSTAL LAKE, ILLINOIS

the P&H Line





in WIRE ROPE, too load strain calls for SPECIALIZED muscles

Everything looks upside down to the three-toed sloth. Unique among animals, he prefers to live his life dangling downward from the top branches of tall trees. Helping him to survive in his topsy-turvy world are highly specialized and powerfully developed rear and forelimb muscles.

In wire rope, too, specialized jobs call for the right kind of muscle. Load strain! Bending fatigue! Shock stress! Abrasion! Each calls for wire rope that best combines the required resistance characteristics.

Complete quality control from ore to finished rope; long experience and specialized know-how—these are your assurance that in Wickwire Rope you always get the proper combination of physical properties for long-lasting, reliable service on your particular job.

For additional information write or phone our nearest sales office.

THE COLORADO FUEL & IRON CORPORATION—Abilene (Tex.) • Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
THE CALIFORNIA WIRE CLOTH CORPORATION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New York • Philadelphia

LOOK FOR THE YELLOW TRIANGLE ON THE REEL

WICKWIRE ROPE

CF&I

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

Save—two ways!

with

WAUKESHA DIESEL—GAS CONVERSION KITS

SAVE Use the most economical fuel for your working location **SAVE** Get double value in ONE engine

Conversion Kits are available for the three biggest Waukesha *Diesel* Oil Field Engines or Power Units—Models 6-WAKD (1197 cu. in.), 6-NKD (1905 cu. in.), and 6-LRD (2894 cu. in.).

In the oil fields of the world, Waukesha is a by-word for dependable full-rated power on gas or Diesel fuels. The Waukesha-engineered Conversion Kit gives you the advantages of two of these real oil field engines—neither of them a compromise! All the basic features which contribute to the ruggedness and long life of the Waukesha Diesel are unchanged in the gas conversion, but the converted engine is a true gas engine with the special features that contribute to power and efficiency where gas is the most economical fuel. Send for descriptive bulletins or call your Waukesha Oil Field Distributor.

WAUKESHA MOTOR COMPANY
WAUKESHA WISCONSIN
New York • Tulsa • Los Angeles

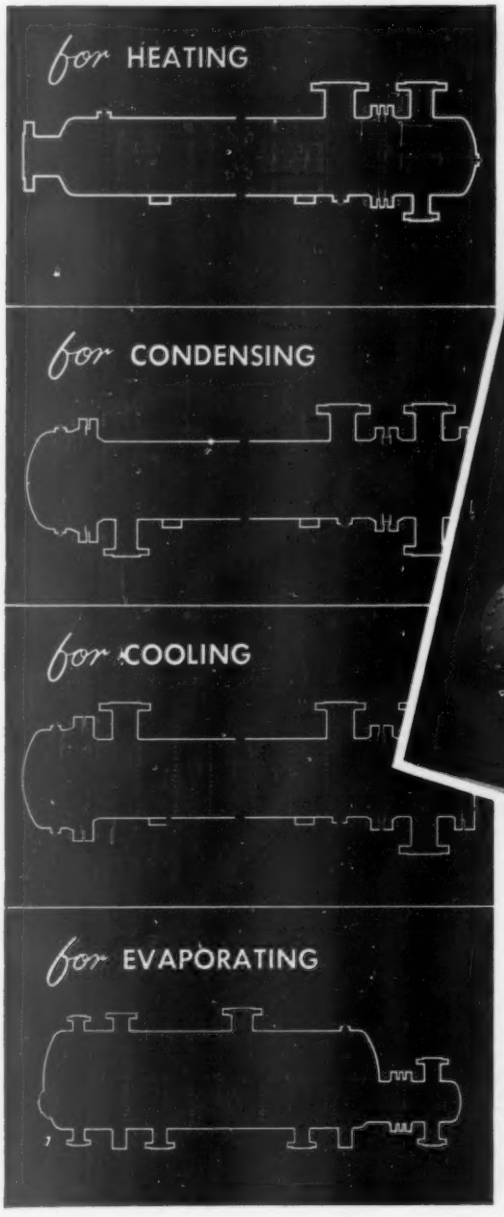
Waukesha Oil Field Diesel Model 6-LRDU

Waukesha Model 6-LRDGU Oil Field Gas Unit converted from Diesel 6-LRDU shown above

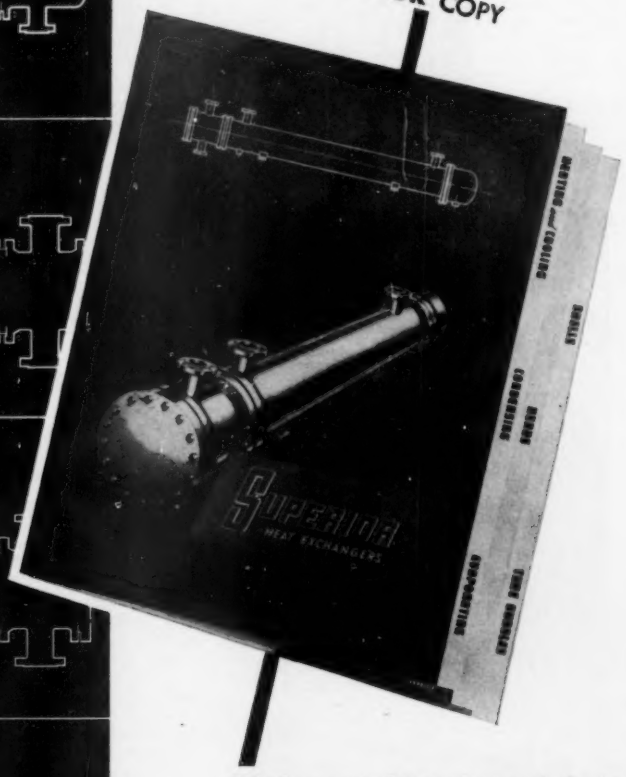
Conversion Kits contain special cylinder heads for gas fuel, top cylinder oilers, a complete gas fuel system, complete ignition system, and accessories.

175

WAUKESHA
OIL FIELD POWER



WRITE FOR **YOUR** COPY



Whether you use heat exchangers for heating, cooling, evaporating or condensing, you'll find help in this informative bulletin describing SUPERIOR Heat Exchangers.

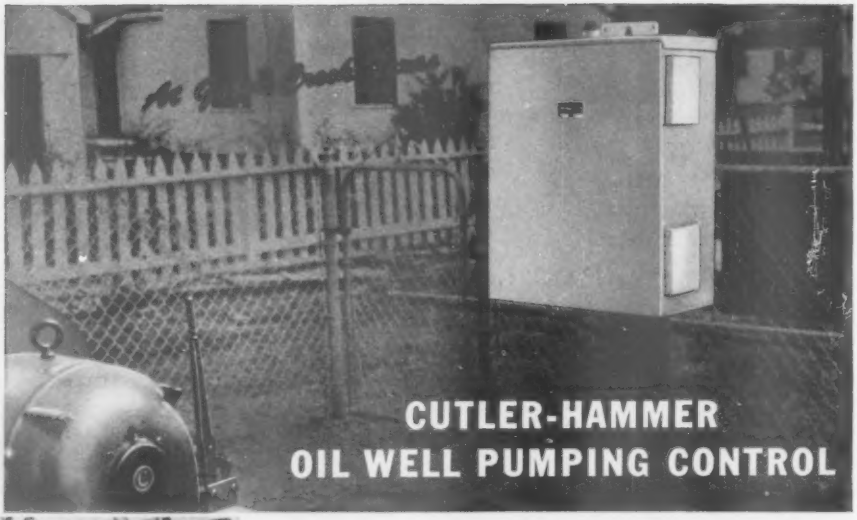
Its clear-cut drawings illustrate the basic components of efficient heat exchanger design, providing the basis for the specification of heat exchangers for almost every industrial application.

To obtain *your* copy, write for Bulletin 520.

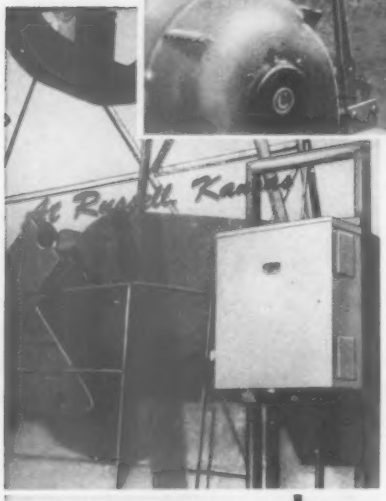
for performance you can **BANK** *on*

SUPERIOR COMBUSTION INDUSTRIES INC.
TIMES TOWER, TIMES SQUARE, NEW YORK 18, N.Y.

SUPERIOR
HEAT EXCHANGERS



CUTLER-HAMMER OIL WELL PUMPING CONTROL



Built for the toughest conditions
Right for any conditions

It can truthfully be said the Cutler-Hammer Oil Well Pumping Control has been designed and built in response to the practical operating needs of the oil country. It has been built to withstand climatic extremes . . . hot, dusty, insect and storm prevalent conditions . . . or salt-laden, hot, humid atmospheres. It has the "stuff" to stand up anywhere.

The controller case has 4 openings for *adequate* ventilation. The aluminum painted case reflects the sun's heat. You don't have to prop the door open to dirt and insects to keep this starter cool.

The ventilators are fine mesh screened, louvered and plate-guarded to keep out dirt, dust and bugs. The vertical contacts shed dust. The timer case is neoprene-gasketed and dustproof . . . the clock motor has extra power—keeps on running—dependably.

Unit type lightning arresters show their condition at a glance.

If one blows, it's clean . . . you don't have to disassemble the starter to clean up afterwards. This control is available without undervoltage relay or *with* undervoltage relay, but the popular type with automatic staggered restarting requires no attention should power fail during a storm, because *proper* restarting is automatic in preset and adjustable intervals. Changes in pumping schedule are easy, accurate. Reset of timer clock is performed by turning a handy palm-sized dial. Wiring diagram with spare parts list and overload heater coil ratings is plastic-covered against grease, sweat, dirt, moisture and wear. These are but a few of the features that make the Cutler-Hammer Oil Well Pumping Control outstanding in the field. CUTLER-HAMMER, Inc., 14[illegible] St. Paul Avenue, Milwaukee 1, Wisconsin. *Associate:* Canadian Cutler-Hammer, Ltd., Toronto, Ontario.

OTHER CUTLER-HAMMER PRODUCTS FOR THE INDUSTRY

Famous Cutler-Hammer UNITROL Control Center
Groups controls in one centralized, flexible housing. All parts interchangeable. Simplifies installation and wiring. Sections easily added. Simplifies servicing and insures better periodical inspection.

Bulletin 9586 Across the Line Starter
For standard or high torque polyphase squirrel cage motors. Famous features, *vertical* dust-safe contacts, eutectic alloy overload relay. Rugged construction, ample reserve. Dust-tight or water-tight enclosing case.

CUTLER-HAMMER
MOTOR CONTROL
C-H

New Faces and Old Names

IN THE WORLD OF OIL

The new faces and new places which appear so frequently in the world of oil only emphasize the truly international aspect of the petroleum industry. As the worldwide search is expanded and intensified, operations are being conducted in an ever increasing number of tongues, by men only recently taught to use modern machinery.

Yet these new faces in the world of oil have one almost universally common bond—their training in drilling and producing oil with National Supply equipment.

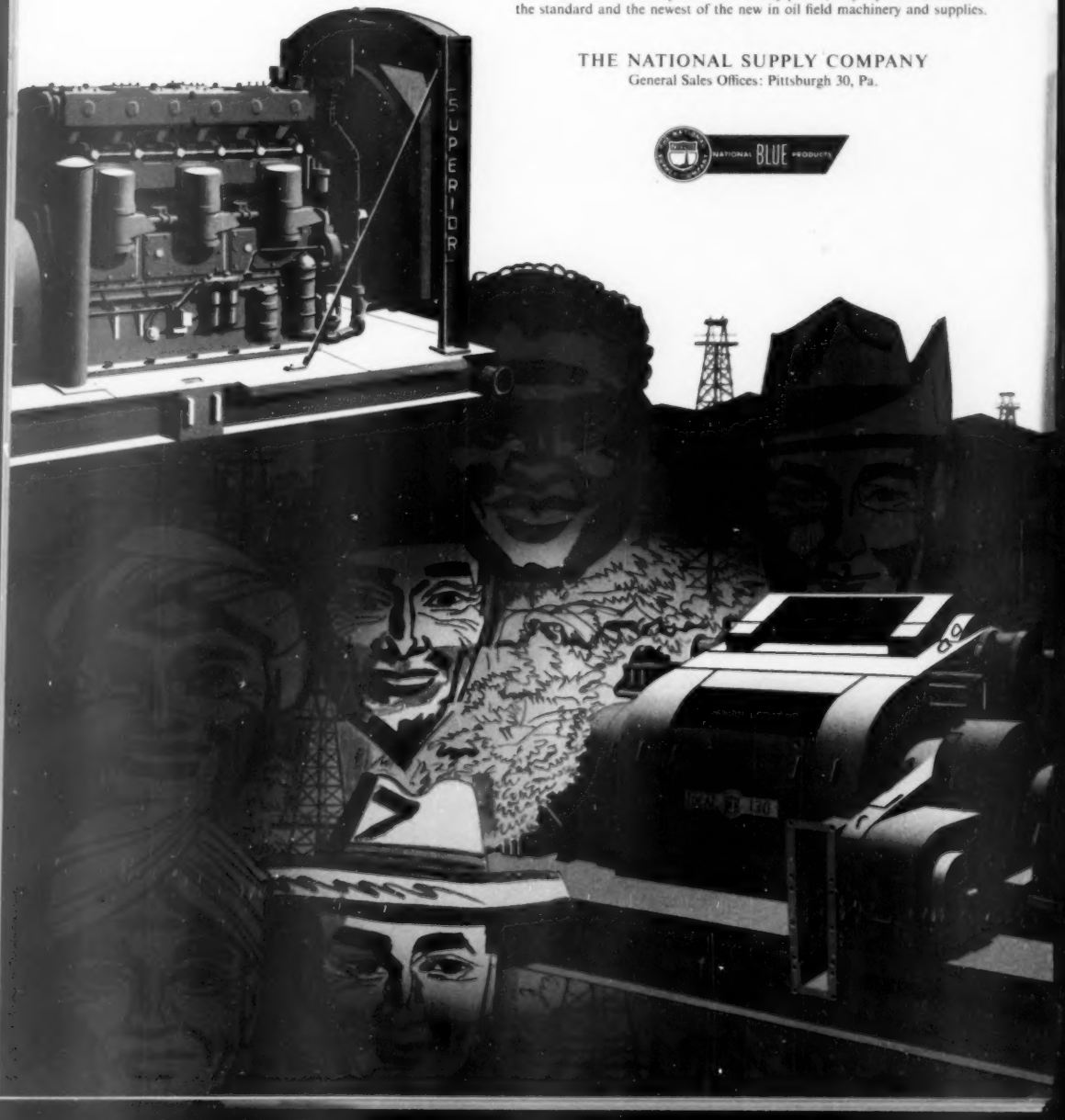
For more than a half century National Supply has been international—manufacturer and distributor of equipment and supplies used at every important oil field throughout the world. In Madison, Kansas, or Mozambique, Calgary, Colombia or Kuwait, everyone associated with oil field operations recognizes the familiar blue of National Supply as an international symbol of service.

Thus the old names—National, Ideal, Spang and Superior—soon become familiar ones to every new face in the world of oil. To the old-timers, who've seen these names so many times in so many places, they represent the best of the standard and the newest of the new in oil field machinery and supplies.

THE NATIONAL SUPPLY COMPANY

General Sales Offices: Pittsburgh 30, Pa.

NATIONAL BLUE PRODUCTS



Built to work together— for Maximum

IDEAL RIGS AND

It's just as true of Ideal Rigs and Drive Groups as it is of every other piece of drilling or production equipment bearing a trademark of National Supply—you're sure to get maximum service out of them because there's so much built into them in the first place.

But there's another important reason why National Ideal Rigs keep right on drilling long after most rigs would be worn out. The experience of National Supply engineers is not limited to any single item such as a draw works or a rotary. Instead, the research and development at National is focused on drilling equipment which must be capable of working together, just as Ideal products work together, from crown block to kelly.

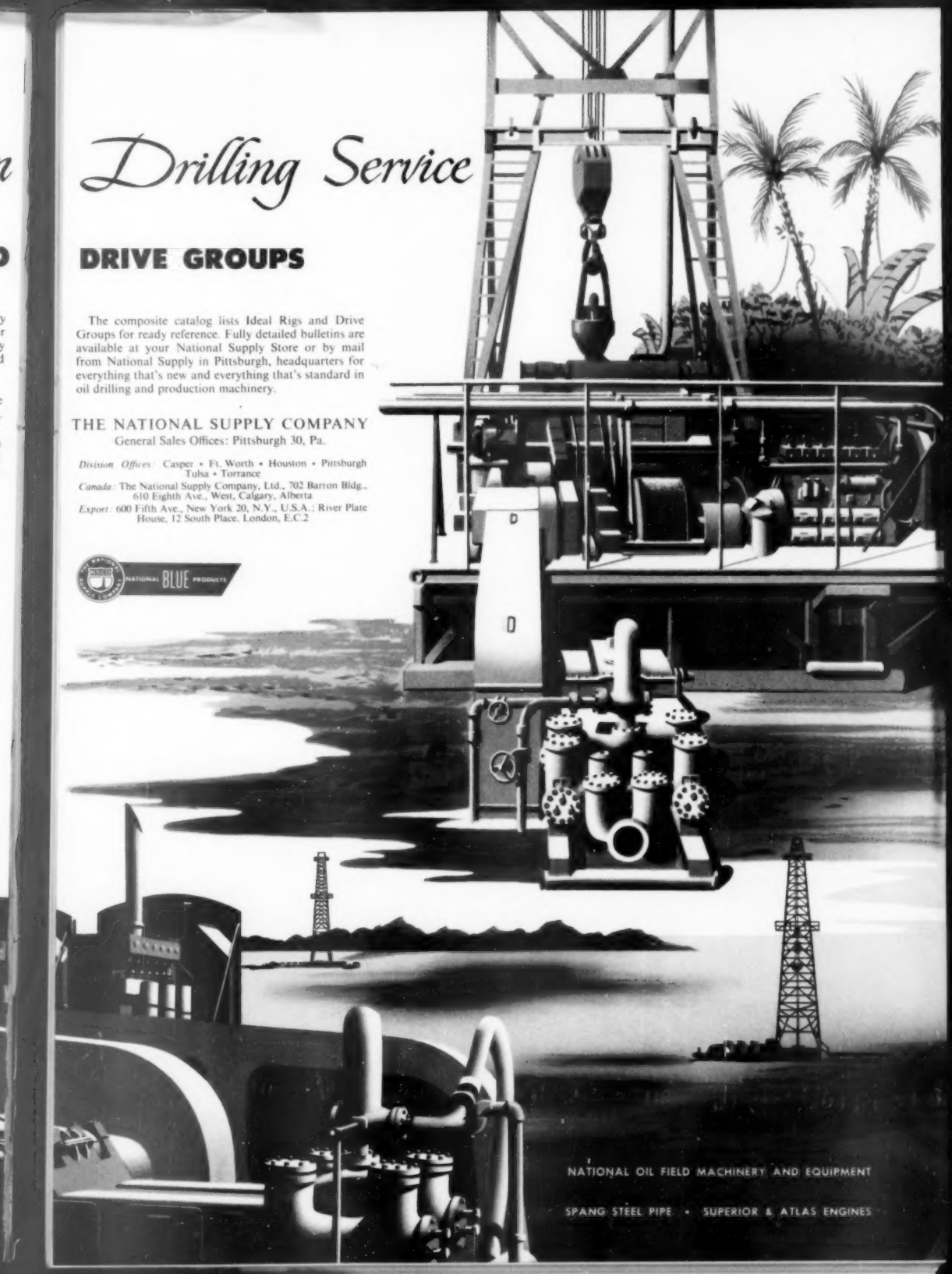
Here, then, in the National catalog of drilling equipment, is a complete family of rigs, drive groups, and accessories for drilling at any depth. They've been proved in service, their important features tested under all sorts of conditions. Here are a few of those features—

RIGS

- Large Diameter Drums—which decrease wear on wire lines
- Dy-A-Flex Clutches—designed and built as integral parts of Ideal Rigs to transmit maximum effective horsepower easily and smoothly under all load conditions.
- Sectionalized Assembly—each section a completely transportable unit built to fit together with other sections so that drilling equipment can be quickly set up and accurately aligned with ordinary field rigging and tool equipment.
- Air Controls—which centralize operation at the driller's station for faster and more efficient drilling.
- Fluid Drives—designed to obtain the maximum effective power from engines operating at optimum r.p.m., and maximum effective work from the driven machinery by automatic load-speed compensation.

DRIVE GROUPS

- Sectionalized construction, each section a complete engine-equipped unit.
- Wide Power Range, with engine and drive combinations from 450 to 2010 input horsepower.
- Integral and Independent Pump Drives, adaptable for any fluid requirement.
- Three types of transmissions, mechanical, fluid and torque converter, to satisfy various drilling requirements.


Drilling Service
DRIVE GROUPS
The composite catalog lists Ideal Rigs and Drive Groups for ready reference. Fully detailed bulletins are available at your National Supply Store or by mail from National Supply in Pittsburgh, headquarters for everything that's new and everything that's standard in oil drilling and production machinery.
THE NATIONAL SUPPLY COMPANY
General Sales Offices: Pittsburgh 30, Pa.
Division Offices: Casper • Ft. Worth • Houston • Pittsburgh Tulsa • Torrance
Canada: The National Supply Company, Ltd., 702 Barron Bldg., 610 Eighth Ave., West, Calgary, Alberta
Export: 600 Fifth Ave., New York 20, N.Y., U.S.A.; River Plate House, 12 South Place, London, E.C.2
NATIONAL BLUE PRODUCTS
NATIONAL OIL FIELD MACHINERY AND EQUIPMENT
SPANG STEEL PIPE • SUPERIOR & ATLAS ENGINES

...and for maximum drill string performance... **SPANG**

DOUBLE SEAL SHRINK THREAD

DRILL PIPE AND TOOL JOINTS

Just as Ideal Rigs and related drilling equipment are built to work together, from crown block to kelly, so are Spang Drill Pipe Products developed for maximum performance from the kelly right down to the rock-bit.

Thus, Spang research in both the strong and weak points of drill pipe performance reached one of its important milestones with the introduction of Spang Double Seal Shrink Thread Drill Pipe and Tool Joints.

The Spang method of metallurgical control of seamless pipe and the mechanical precision of the double metal-to-metal seals on the tool joints combined to help correct major operating problems.

The serviceability of Spang Double Seal Shrink Thread Drill Pipe and Tool Joints is a matter of record in every oil field. And these records emphasize the savings in operating cost, in comparison with conventional drill pipe. Here are some of the advantages reported by drillers:

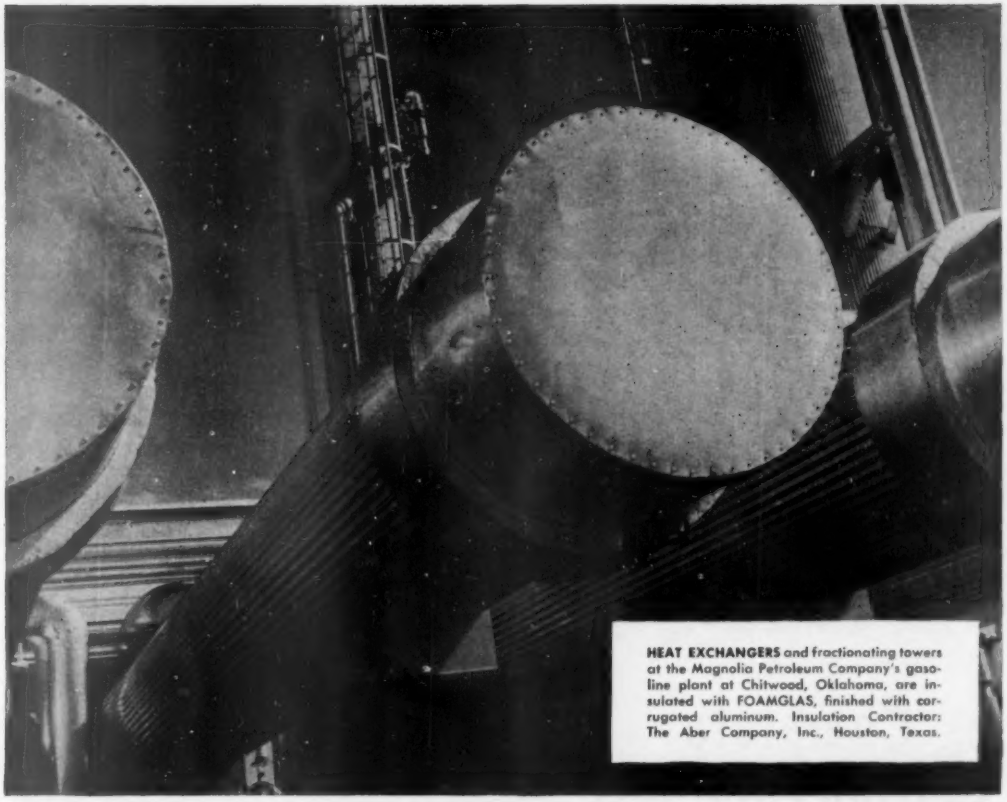
- Reduction in drill pipe failures and costly down-time.
- Complete sealing against internal and external pressures
- Rapid replacement of tool joints right at the rig
- Quick and accurate engagement of threads in make-up

One other point to remember, however, is that drill pipe for every type of drilling is produced under the Spang name. Ask for copies of bulletins describing Double Seal Shrink Thread Drill Pipe and the companion Spang product, Spangweld Drill Pipe.

SPANG-CHALFANT DIVISION
THE NATIONAL SUPPLY COMPANY
General Sales Offices: Pittsburgh 30, Pa.

Division Tubular Offices: Denver, Colorado • Houston, Texas • Fort Worth, Texas • Los Angeles, California • Pittsburgh, Pennsylvania • Tulsa, Oklahoma • Calgary, Alberta, Canada

NATIONAL BLUE PRODUCTS



HEAT EXCHANGERS and fractionating towers at the Magnolia Petroleum Company's gasoline plant at Chitwood, Oklahoma, are insulated with FOAMGLAS, finished with corrugated aluminum. Insulation Contractor: The Aber Company, Inc., Houston, Texas.

Keeping changers and crackers on stream

• Under the aluminum finish of these heat exchangers and cracking towers FOAMGLAS helps keep temperatures at the exact levels required to assure continuous, efficient operation. For these and other jobs, on indoor and outdoor piping, on valves, fittings, tanks and other process equipment, FOAMGLAS has won wide preference in many big modern refineries.

FOAMGLAS is composed of millions of tiny sealed glass bubbles, which contain dead air. Glass is not affected by moisture, vapor and other harmful elements, so FOAMGLAS *keeps* its original insulating value, without costly maintenance.

You can get FOAMGLAS in all standard sizes for piping, in factory fabricated covers for valves and fittings and in special shapes for tanks, towers and other refinery equipment. Before you figure on insulation, send for a sample of FOAMGLAS and a free copy of our latest booklet.

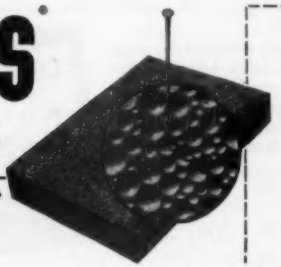
PITTSBURGH CORNING CORPORATION · PITTSBURGH 22, PA.

PITTSBURGH PC CORNING

FOAMGLAS®

the cellular glass insulation

The *best* glass insulation is cellular glass. The only cellular glass insulation is FOAMGLAS. This unique material is composed of still air, sealed in minute glass cells. It is light weight, incombustible, verminproof. It has unusually high resistance to moisture, chemicals and many other elements that cause insulation to deteriorate.



Pittsburgh Corning Corporation
Dept. DD-62, 307 Fourth Avenue
Pittsburgh 22, Pa.

Please send me, without obligation, a sample of FOAMGLAS and your FREE booklet on the use of FOAMGLAS for Piping and Process Equipment.

Name.....

Address.....

City.....State.....

Complete Seating Contact!

You know you've got it with . . .

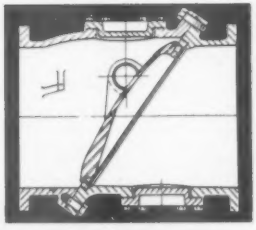
CHAPMAN

Exclusive TILTING DISC *Check Valve*

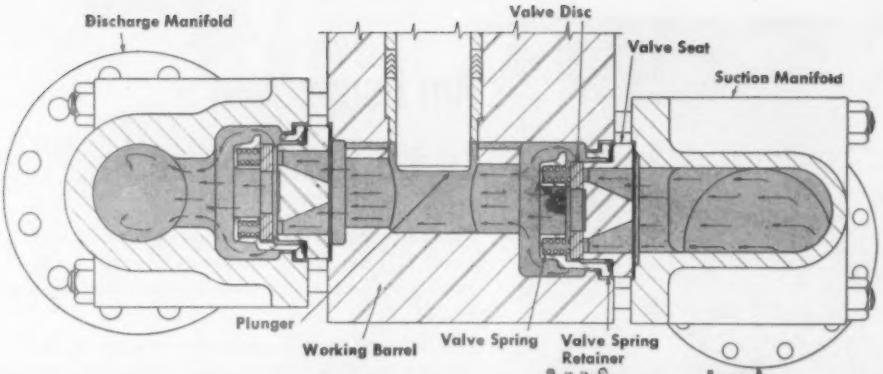
Nothing can "unseat" the disc-ring of this valve from its *drop-tight* contact with the body-ring . . . because clearance at the hinge-pins means that this contact is *complete*. There is no sliding action, consequently no wear, no leakage. And the pivoted disc is cushioned to an easy, silent closing . . . without slam . . . in installations that don't have unusual piping arrangements.

What's more, hydraulic laboratory tests at a top engineering school prove that the specially designed disc and streamlined valve-body reduce head loss as much as 80% under conventional swing-type check valves. See the graphs of these tests . . . and illustrations of the unique construction features of Chapman Tilting Disc Check Valves . . . in Catalog No. 30 (yours for the asking). *Write.*

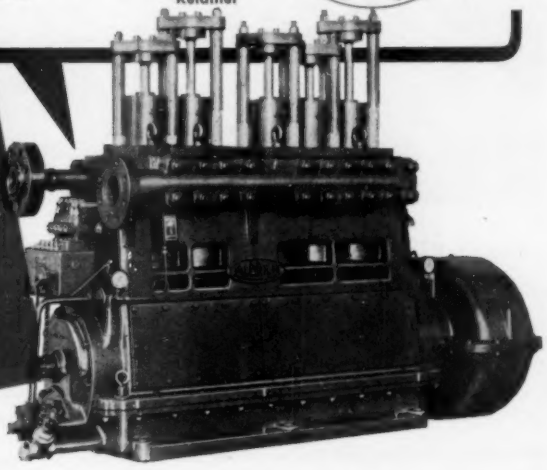
THE CHAPMAN VALVE MFG. CO.
INDIAN ORCHARD, MASSACHUSETTS



Cross-section of the Chapman Tilting-Disc Check Valve. A feature of the design is that the disc seat lifts away from the body seat when opening, and drops into contact when closing, with no sliding or wearing of the seats.



ENGINEERS: Check these points of Aldrich Direct Flow Design



Aldrich engineers eliminated two right-angle turns in the fluid-end. Now, liquid passes from suction to discharge manifold in a *straight line.* That gave the Direct Flow Pump its name, and set up a whole new concept of pumps, pumping, and pump maintenance. It all adds up as follows:

☐ **Increased operating speeds**—you get whatever volume and pressure you need *from a smaller, lighter, more compact pump.*

☐ **Sectionalized construction**—parts can be replaced at a fraction of the cost of a new fluid-end; also, parts can be made of stainless, bronze, Monel or other special materials—extremely important for corrosive fluid service.

☐ **Maintenance made easier**—no more tapered bores in the working barrel. Manifolds are *not* taken off but slide out on studs—affording room to *lift out* valves as complete units. Packing is easily renewed—note accessibility of stuffing boxes.

☐ **Interchangeable wearing parts**—available among 3, 5, 7 and 9 plunger pumps of same stroke size. This minimizes spare parts costs and inventories.

☐ **Changeable plunger sizes**—in many cases it is only necessary to add new plungers, glands, throat bushings and packing *to the same fluid-end.*

☐ **Drive direct**—by connection to synchronous engine type motor or internal combustion engine; also with integral speed reducer or V-belts.

Contact your Aldrich Representative . . . or write to us direct for complete details on 3", 5" or 6" stroke units.

THE ALDRICH PUMP COMPANY

9 GORDON STREET • ALLENTOWN, PENNSYLVANIA

...Originators of the Direct Flow Pump

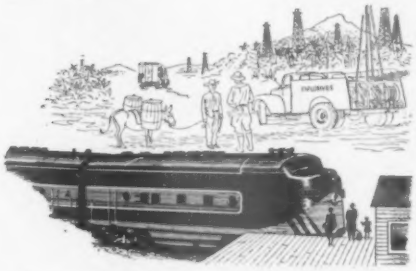
Representatives: P. H. Arden, P. O. Box 185, Glenview, Ill. • Bushnell Controls & Equipment Co., 3929 W. Jefferson Blvd., Los Angeles 16, Calif. • L. T. Gibbs, 509 Petroleum Bldg., Tulsa 3, Okla. • R. B. Moore Supply Co., Inc., Bolivar, N. Y. • Power Specialty Co., 2000 Kipling St., Houston 6, Texas • Reeves & Skinner Machinery Co., 2211 Olive St., St. Louis 3, Mo. Stearns-Roger Manufacturing Co., 1720 California St., Denver 2, Colo. • Export Sales: Petroleum Machinery Corp., 30 Rockefeller Plaza, New York 20, N. Y. • Birmingham • Boston Buffalo • Cincinnati • Cleveland • Detroit • Duluth • Jacksonville • Omaha • Philadelphia • Pittsburgh • Portland, Ore. • Richmond, Va. • San Francisco • Seattle • Spokane, Wash. • Syracuse

"Am I supposed to be glad you're big?"

Many people write us *such comments as this: "I've heard people talk against big companies like you. Lately I've been reading your statements about bigness. Am I supposed to be glad you're big?"*

The answer to this question depends on your answer to certain others. "Big business" often gets the blame for many things, so that some people have come to feel that *bigness* itself may be bad. But in making up your own mind on this proposition, it's well to consider the *good* that comes from this same bigness.

Do you like a bargain? You're getting one in gasoline. Except for taxes, gasoline today costs just about what it did in 1925. (And it's better gas; 2 gallons now do work that then took 3.) Why? Largely because of *competition* among big oil companies.



Are you glad you have the conveniences of this "machine age?" They depend heavily on oil. You're assured an ample supply of oil by the enterprise of big companies like Standard. We seek out new crude reserves, in this country and abroad, with exploration that may cost millions before the first gallon is found.

Do you like new and better things? Standard has spent over $35,000,000 on research and technical service in the last 5 years, developing new or improved products, and new raw materials for other companies. Yet only when allowed to grow big, by serving you better, can we take on the work and risk involved.

Do you want to keep your country strong? It takes big companies to back our fighting men and keep defense goods in full supply. Standard is at work for our government on aviation gasolines, atomic research, synthetic rubber, and other vital projects.

Obviously, there are countless ways to express the benefits you gain by our bigness . . . countless questions we could ask, to which you'd probably answer "yes" just as readily. And if you like the things that bigness brings, then you *can* be glad we're big.

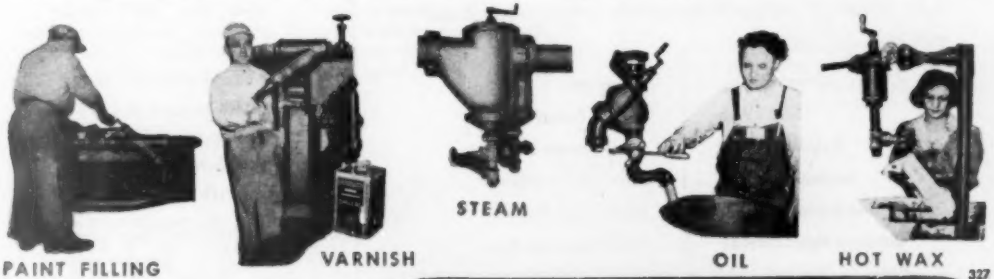
STANDARD OIL COMPANY OF CALIFORNIA

• plans ahead to serve you better

The three six inch scraper strainers shown above are insuring a usable water supply 24 hours a day in this busy Detroit paper mill—it is river water which at times is full of debris. Pressure gauges tell the operator when the strainer needs scraping. Then, a few turns of the handles remove all material from the screens and the water pressure becomes normal again.

There are many uses for this Sarco product. Foods and chemicals are run through screens of varying sizes just before packaging. Hot liquids, such as wax and auto frame paint, are purified, and the exhaust steam containing lint from steam hammers is made suitable for use in unit heaters in a large Cleveland metal plant.

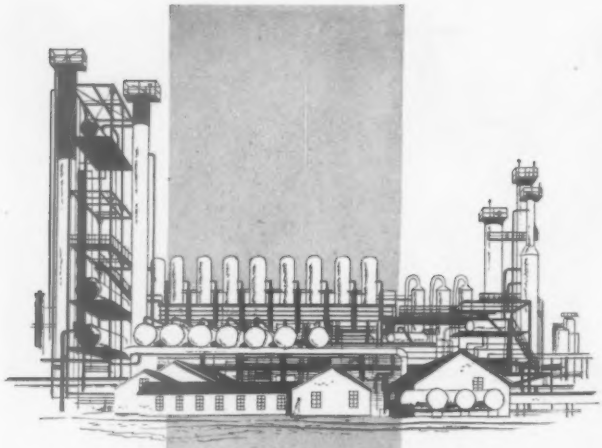
Scraper Strainers are available in sizes from ¾" to 8", up to 200 lbs. pressure, hand or motor operated. Bodies, screens and rotors can be made of any metal needed for the application. Ask for Catalog No. 1225.



327

SARCO
SAVES STEAM
IMPROVES PRODUCT QUALITY AND OUTPUT

SARCO COMPANY, INC.
Represented in Principal Cities
Empire State Building, New York 1, N. Y.
SARCO CANADA, LTD., TORONTO 8, ONTARIO



MORE BASIC CHEMICALS FROM MATHIESON . . .

CAUSTIC SODA

Basic alkali of petroleum refining, caustic soda is but one of the essential raw materials manufactured for the petroleum industry by Mathieson. Today, from a widely diversified production, Mathieson enables refiners to secure *more* basic chemicals from *one* dependable source...such chemicals as:

Caustic Soda	Ammonia
Soda Ash	Liquid Chlorine
Sulphuric Acid	Bicarbonate of Soda
Sodium Chlorite	Processed Sulphur
Triethylene Glycol	Diethylene Glycol
Calcium Hypochlorite	Dichloroethylether

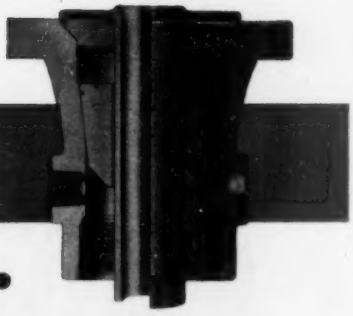
Under current market conditions, a dependable source of supply is especially important. You may be able to buy *to better advantage* by consulting with us now. Mathieson Chemical Corporation, Baltimore 3, Maryland.

Mathieson
CHEMICALS

SERVING INDUSTRY, AGRICULTURE AND PUBLIC HEALTH

9903

ONLY RECTORHEAD CASING HEADS . .



. . give you these *Vitally Important* advantages

RING-OF-STEEL SEAL
A good weld plus API ring gasket make the Rectorhead seal the strongest, safest casing head seal available. It never requires repacking or maintenance.

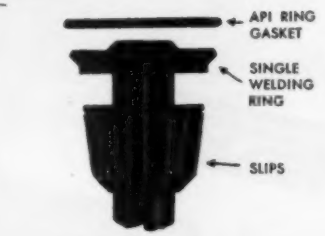
FIRE-PROOF, FREEZE-PROOF
Seal can't burn out in case of fire . . . won't contract due to freezing, even in coldest weather. Immune to corrosion inhibitors.

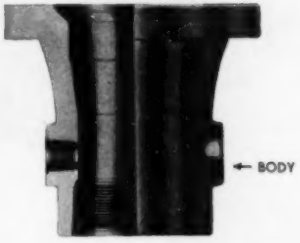
SIMPLE INSTALLATION
Just set slips, cut off pipe, weld ring to pipe and seal is completed by API ring gasket when blowout preventer, subsequent head or other equipment is bolted in place.

NO RESILIENT PACKING
Rectorheads have no complex packing and slip arrangement. You are not dependent on soft packings to hold the important seal between strings of pipe.

NO BULKY WELDING FLANGE
The welding ring fits into a ground seat in the Rector head body. Pipe is cut off practically flush with welding ring. Blowout preventer, or subsequent equipment is flanged directly on the head body.

PROTECTOR RING
When drilling operations are carried on through the head this ring, furnished with every casing head, protects the slip and welding ring seating surfaces in the body from being damaged by drilling tools.





• Notice how slips, welding ring and API ring gasket are easily installed in the RECTORHEAD Casing Head. All blowout preventers, valves, flanges, spools and tubing heads of API specifications will bolt directly to all RECTORHEADS.

RECTOR WELL EQUIPMENT COMPANY INC

★ MAKING THE OIL INDUSTRY SAFER ★

1100 NORTH COMMERCE ST FORT WORTH, TEXAS

Houston Plant: 2215 Commerce St.

REPRESENTATIVES IN ALL ACTIVE FIELDS

RECTORHEAD RECTOR FULBORE CEMENTING METHOD RECTORSEAL

ASSOCIATION OF WELL HEAD MANUFACTURERS CERTIFIED

Now, say FLEXON when you specify expansion joints for piping

Free-flexing units in stainless steel or copper for pressures to 30 psi; sizes to 48" I.D.
Controlled-flexing units in stainless steel or copper for pressures to 300 psi; sizes to 48" I.D.
Integral ring units in stainless steel for pressures to 5500 psi; temperatures to 1600° F; sizes to 6" I.D.

WITH the change of our corporate name from Chicago Metal Hose Corporation to FLEXONICS Corporation, CMH Expansion Joints are now known as FLEXON Expansion Joints. Just as the corporate name was changed to better describe the company's manufacturing activities, the name FLEXON should allow easier identification of these units.

Wherever motion is encountered in piping, the problem can be solved with FLEXON Expansion Joints. These dependable units are easily installed in new or existing lines and require only slightly more space than straight pipe. They cannot leak and require no maintenance.

Write for our new Expansion Joint "Design Guide". And remember, when you specify expansion joints, you now say, "FLEXON".

Flexonics Corporation

EXPANSION JOINT DIVISION
1345 S. THIRD AVE. • MAYWOOD, ILLINOIS

FORMERLY CHICAGO METAL HOSE CORPORATION

Flexon identifies products of Flexonics Corporation that have served industry for over 50 years.

Manufacturers of Convoluted and Corrugated Flexible Metal Hose in a Variety of Metals • Expansion Joints for Piping Systems • Stainless Steel and Brass Bellows • Flexible Metal Conduit and Armor • Assemblies of These Components

In Canada: Flexonics Corporation of Canada, Ltd., Brampton, Ontario

Larger Bore....

Heavier Steel Fluid End....

in Bethlehem Slush Pumps

Now, in all the four top sizes of Bethlehem slush pumps, you get a larger bore to accommodate an 8-in. liner. This means greater volume, of course. And all four sizes are equipped with heavy, massive fluid ends to withstand the pressures of modern drilling. It's a Bethlehem *plus*—extra volume at those extra-high pressures.

These pumps are mighty rugged. Even the 225, smallest of the group, is a powerhouse. And the 600, head man of the lot, is the biggest, strongest unit Bethlehem has ever offered.

There are many features common to all—features that add to the smoothness, long life, and overall efficiency of the pumps. For example: complete oil-bath lubrication (trouble-free!). And roller bearings throughout. And such important details as API metal ring gaskets on valve covers, suction flanges, discharge flanges, stuffing boxes.

We can't possibly tell you the full story in this small space. But any time you say, a Bethlehem engineer will be glad to go over the units with you, point by point. There's a Bethlehem pump for every drilling job you have. Ask for full details today.

CHOOSE YOUR PUMP FROM THESE FOUR SIZES:

Input Hp.	Bore & Stroke
225	8 in. x 14 in.
325	8 in. x 16 in.
450	8 in. x 16 in.
600	8 in. x 18 in.

A complete line for depths ranging from 3500 ft to maximum.

In addition to its manufacturing plants and its sales and engineering service, Bethlehem Supply Company maintains stores throughout the Rocky Mountain, Midcontinent, Southwestern, and California oil fields. There are almost 50 of these modern, up-to-the-minute stores, all fully stocked to meet local day-by-day requirements.

BETHLEHEM STEEL

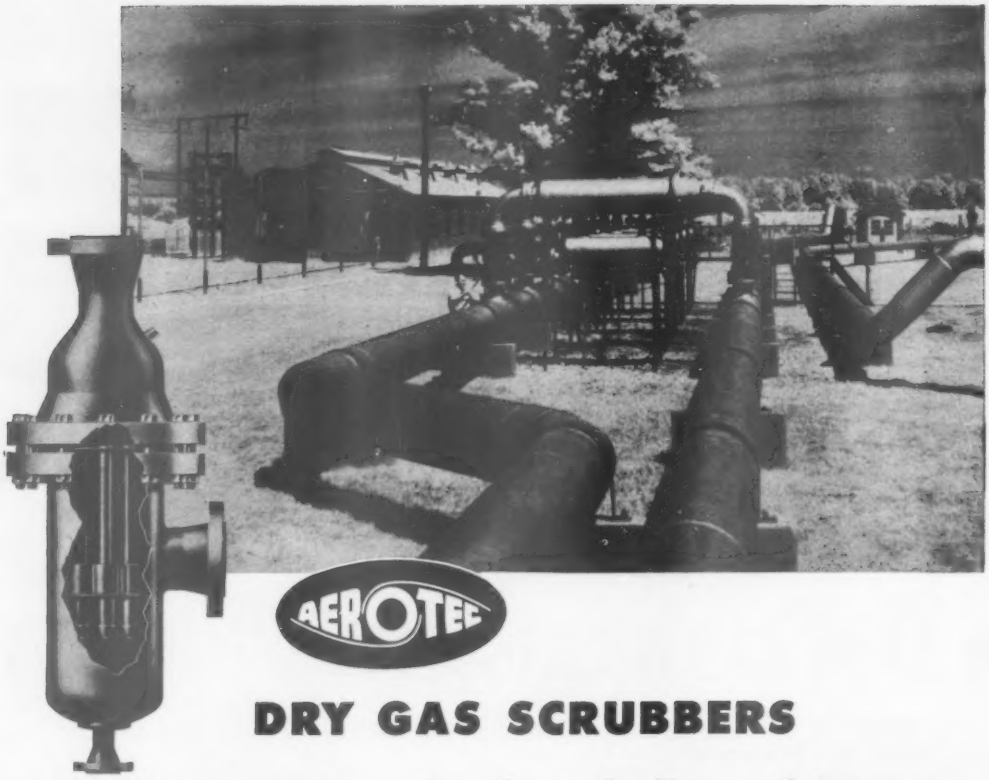
BETHLEHEM SUPPLY COMPANY

General Offices: 21 E. Second St., Tulsa, Okla.

West Coast Headquarters: Los Angeles, Calif.

Export Distributor: Bethlehem Steel Export Corporation 25 Broadway, New York, N. Y.

Canadian Representative: Rocky Mountain Supply Co., Ltd., Calgary, Alberta



AEROTEC

DRY GAS SCRUBBERS

protect compressors and reduce pipeline maintenance

Dusts and distillates in natural gas put an unnecessary drag on profitable pipeline operation. Aerotec Dry Gas Scrubbers get rid of these damaging impurities with high efficiency, thereby reducing maintenance to a minimum. This is a proven fact in well and pipeline installations across the country.

The Aerotec Scrubber, unlike conventional types, uses no liquid filtering medium. Hence, you eliminate carryover of elements that cause compressor wear. You also avoid other difficulties normally encountered with wet-bath scrubbing methods. The Aerotec units assure clean, *dry* gas that flows freely and saves on repair and maintenance costs.

Basis of this efficiency is a unique method of scrubbing gas by the use of multiple, small-diameter tubes. Through the principle of dry separation by centrifugal force, foreign solids and liquids are precipitated, leaving the gas clean and dry.

Simplified piping permits easy installation of the compact, lightweight Aerotec Dry Gas Scrubber. Standard units up to 100,000,000 SCFD are available, with larger capacity requirements met by manifolding. For technical data and engineering assistance in selecting the Aerotec Scrubber best suited to your gas-cleaning needs, call or write our representatives today.

Project Engineers **THE THERMIX CORPORATION** Greenwich, Conn.

(Offices in 38 Principal Cities)

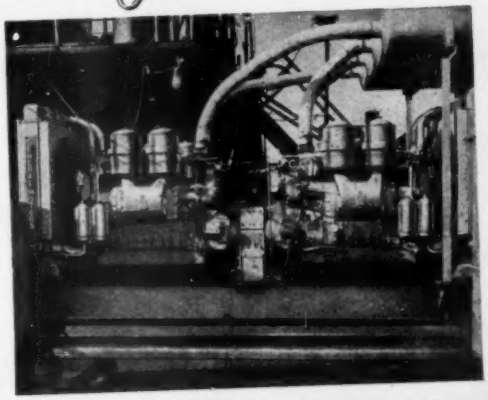
Canadian Affiliates: T. C. CHOWN, Ltd., Montreal 25, Quebec; Toronto 3, Ontario

Manufacturers

THE AEROTEC CORPORATION

GREENWICH, CONN.

GM DIESEL
CASE HISTORY No. 5111-14
USER: Glasscock Drilling Company, Corpus Christi, Texas
INSTALLATION: More than 80 GM Diesels, powering the majority of Glasscock's drilling rigs and offshore crew boats.
PERFORMANCE: Company states "over four years of continuous drilling with our GM Diesels has developed conclusive proof of the dependability and economy of GM Diesel engines."



"This Diesel proved itself for us"

GM
GENERAL MOTORS
DIESEL POWER

Marked for *Corrosion!*

Harco CATHODIC PROTECTION SYSTEMS CAN SAVE YOUR UNDERGROUND PIPING

The ravages of corrosion take an annual toll of $600,000,000 for the maintenance and replacement of underground gas, oil and water pipe. You can protect *your* plant and cross-country piping from silent, vicious corrosion with a **HARCO** designed and engineered protection system.

HARCO corrosion control systems assure longer service life, minimum maintenance and replacement, elimination of "down-time" and protection from the hazards caused by corrosion damage.

To escape the costly fate of corroded pipe lines, call on **HARCO** . . . *first in the field of cathodic protection.*

WRITE TODAY for catalog or call MOntrose 2-2080.

THE *Harco* CORPORATION *Cathodic Protection Division*

16961 BROADWAY • CLEVELAND, OHIO

here's where eccentricity pays off!

ECCENTRIC CONSTRUCTION . . . gives **GARDNER-DENVER SLUSH PUMPS** extra resistance to shock and high plunger loads. Eccentric construction permits the use of large area bronze bearings . . . straight through main shaft that's solidly mounted for added frame rigidity. Write for Bulletins FX-10 and P-70.

Factory-Trained Service Specialists available for complete service on location

SINCE 1859

GARDNER-DENVER

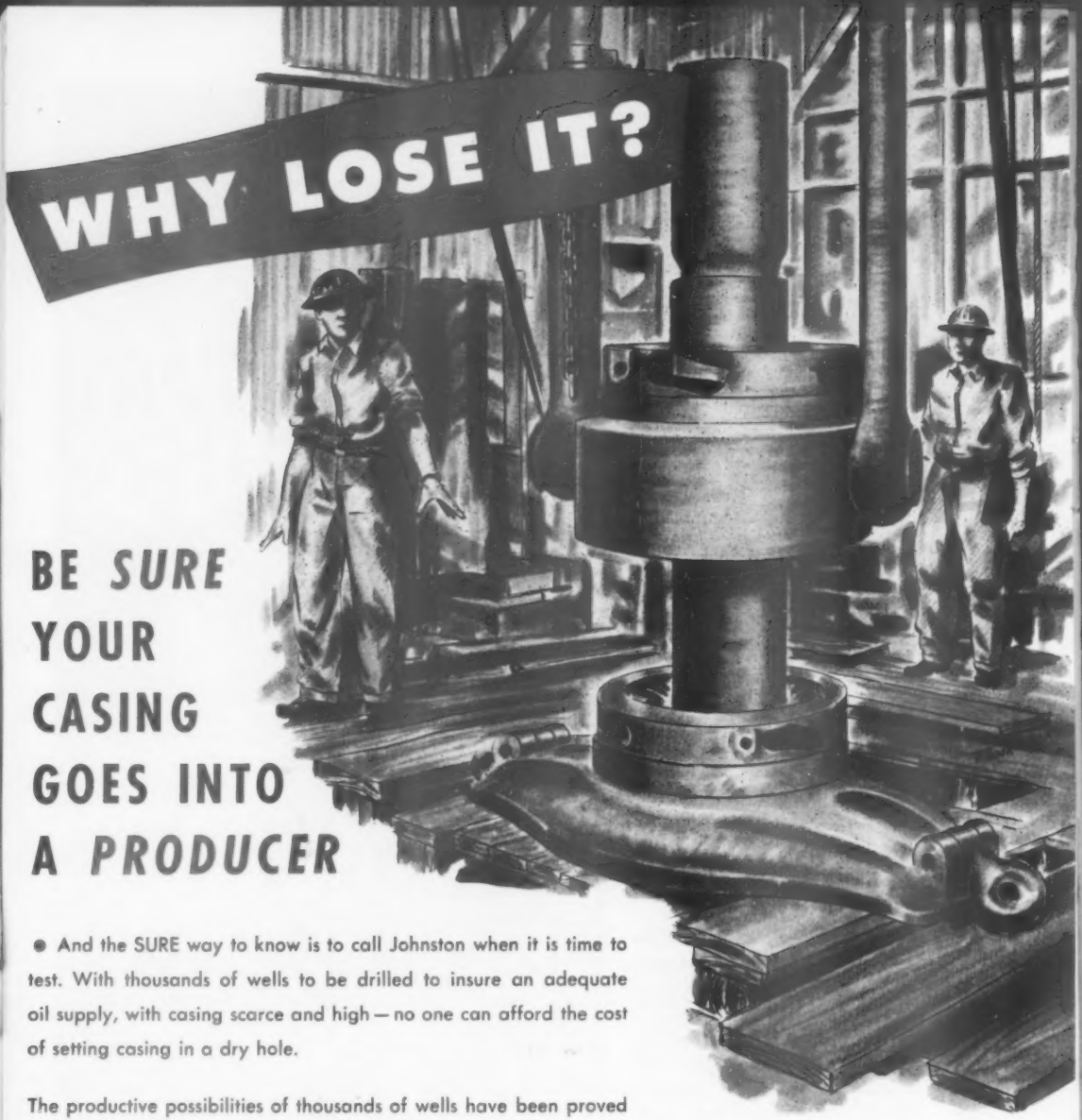
Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., Toronto, Ontario

Dallas • Houston • Tulsa • St. Louis • Los Angeles • San Francisco
New York • Chicago • Pittsburgh • Denver • New Orleans

Continental Supply Co., Continental Bldg., Dallas, Tex.
Export Division: 30 Rockefeller Plaza, New York, N. Y.

Republic Supply Co. (Of Calif.), 2600 S. Eastland Ave., Los Angeles, Calif.

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS



BE *SURE* YOUR CASING GOES INTO A *PRODUCER*

● And the SURE way to know is to call Johnston when it is time to test. With thousands of wells to be drilled to insure an adequate oil supply, with casing scarce and high — no one can afford the cost of setting casing in a dry hole.

The productive possibilities of thousands of wells have been proved by the Johnston Open Hole Tester. It will do the same for you.

EXPERIENCED SERVICE MEN OPERATE IN ALL ACTIVE AREAS

JOHNSTON TESTERS, INC.

5702 NAVIGATION BLVD. ● HOUSTON, TEXAS

EXPORT DIVISION: 3035 Andrita St. Los Angeles 65 California

SERVICE BRANCHES IN ALL ACTIVE AREAS

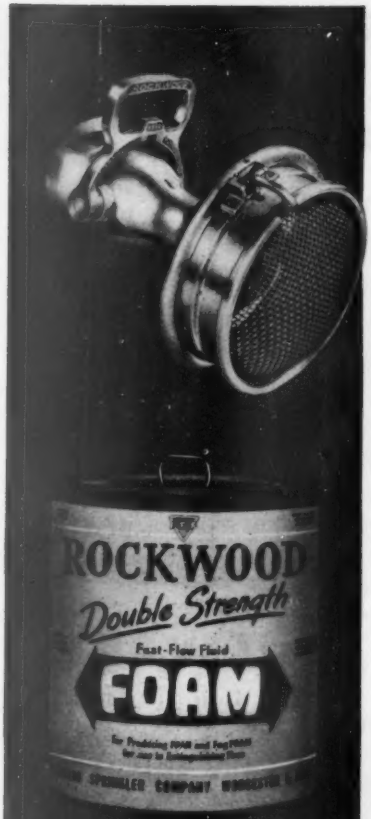
There's a Johnston Service Representative Near You

FORMATION AND CASING TESTING — JOHNSTON

Cut Your Fire Losses

With This Tested

Rockwood Equipment



ROCKWOOD TYPE FFF FogFOAM NOZZLE WITH FogFOAM SCREEN puts out large fires in gasoline, benzol, and other highly volatile flammable liquids. Provides far greater extinguishing action than ever before possible with old-style chemical or mechanical foam equipment. Used in industrial plants, oil transport companies, refineries, airports, and municipal fire departments. Three sizes for service on 1½", 2½", and 3½" fire hose lines.

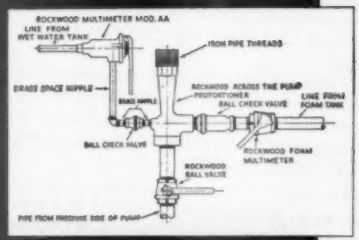
Nozzle provides three different discharges . . . FogFOAM with *screen* (shown), solid FOAM stream with *foam shaper* (not shown), and/or high-velocity WaterFOG by shutting off FOAM liquid. Through FogFOAM screen, 2½" size discharges 200 gpm @ 100 psi. Range: approximately 30 feet. Approved by Underwriters' Laboratories, Inc.

ROCKWOOD DOUBLE STRENGTH, FAST-FLOW FLUID FOAM LIQUID (3%) extinguishes large spill fires in gasoline with maximum speed and safety to firemen. More fluid, faster spreading. Mixed with 97 parts water, it forms excellent foam blanket that quickly re-seals if broken. Flows freely at sub-zero temperatures (−15°F). Clings to metal surfaces as an insulator. Will not cause corrosion and is easily washed off.

Used with fire hose line nozzles and permanently piped FogFOAM and FOAM installation. Comes in 5-gallon cans or 50-gallon drums.

Approved by Underwriters' Laboratories, Inc.

Regular Rockwood FOAM Liquid (6%) also available in 5-gallon cans or 50-gallon drums.



ROCKWOOD MODEL DUAL "B" AROUND-THE-PUMP PROPORTIONER automatically feeds FOAM liquid or wetting agent into hose lines. Eliminates waste, assures accurate mixing. Used when pressure is maintained by a pump from draft supply or booster tank. Operates in range from ¾" booster lines to 2½" hose lines.

Multimeter settings admit proper amounts of wetting agent for varying nozzle discharges and solution strengths — metering valve serves same purpose on FOAM side of eductor. Ball check valve prevents water from backing into FOAM liquid container.

Maximum nozzle discharge when using FOAM liquid: 200 gpm — when using 1% wetting agent solution: 100 gpm.

Custom-engineered proportioning systems for all mobile equipment are also available.

GET YOUR COPY of this informative, illustrated, 12-page booklet on Rockwood Fire Fighting Products. Write direct to Rockwood Sprinkler Company, 104 Harlow Street, Worcester 5, Massachusetts.

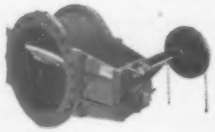
ROCKWOOD

ROCKWOOD SPRINKLER CO.

Engineers Water...to cut fire losses

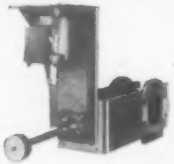
R-S valvEvents

• EXCERPTS FROM THE R-S BOOK OF EXPERIENCE •



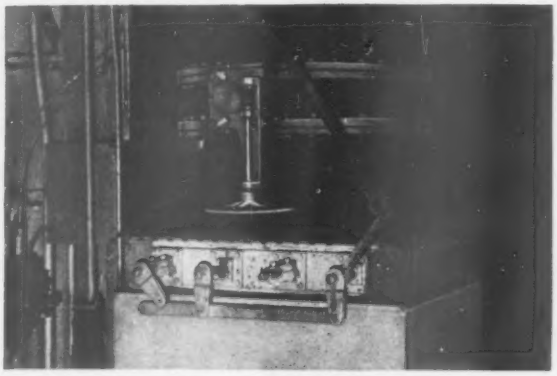
WATER SERVICE—No. 825—36-inch 125-pound cast iron valve equipped with 18—8 shafts, bronze bushings and rubber seat for 85-pound drip tight shut-off.

EMERGENCY OIL SERVICE—No. 628—solenoid trip valve. Should the solenoid function, the latch is tripped which causes the counter-weight to open or close the valve by gravity. Available in any metal or alloy and in various sizes for emergency shut-off or vent for air, gas, steam, oil, and water.



700° F. EXHAUST GAS SERVICE—No. 826—6-inch 125-pound R-S "H" metal valve used on small turbine generator. Equipped with 18—8 shafts, hastelloy bushings, finned lubricated stuffing box and solenoid trip mechanism.

STEAM SERVICE—No. 677—1500-pound welding end steel valve for superheated steam—A. S. M. E. Standards.



SEMI-SOLID SERVICE including abrasive and corrosive materials.

R-S VALVES
Control and Shut Off Practically Any Material

The beveled vane seats firmly at a 12½° angle and is closed from a fully open position through 77½° of arc by either manual or automatic operation. A metal-to-metal seat gives satisfactory commercial shut-off. When required, Monel or stainless steel can be welded to the vane periphery and a babbitted seat used in the valve body. Drip tight or bubble tight closure can be obtained with a rubber seat.

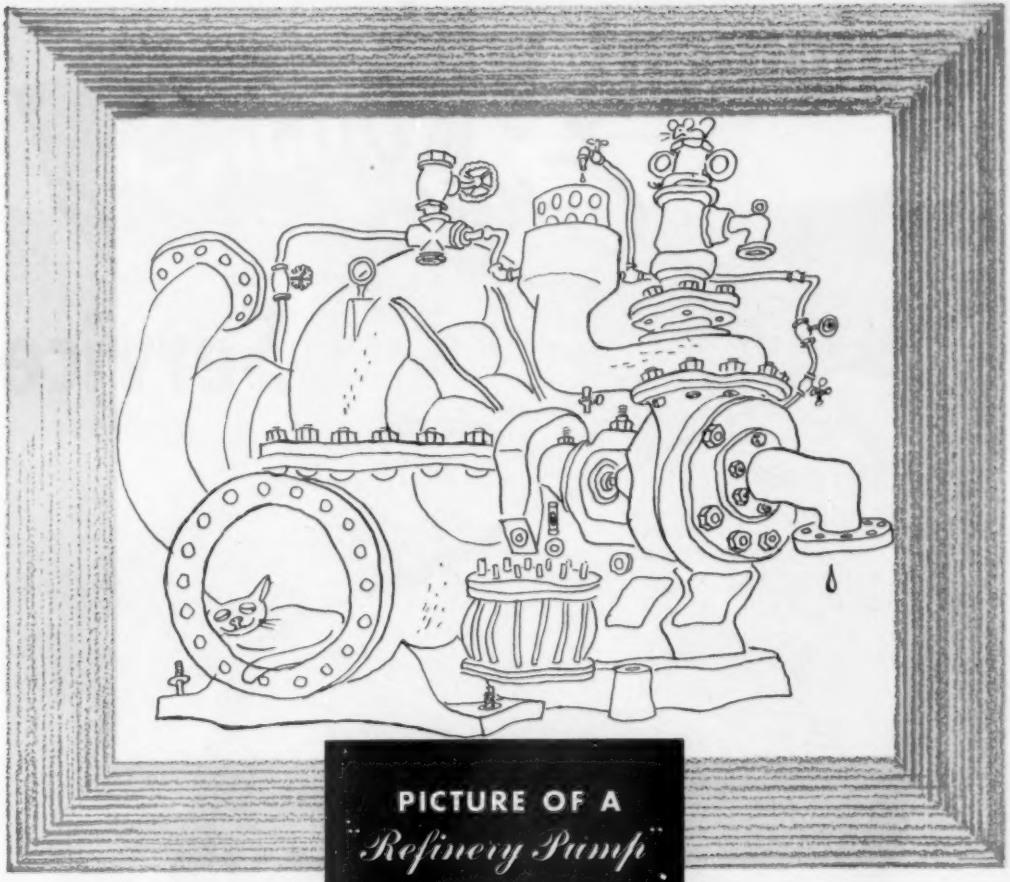
Power controlled prime movers delivering the necessary foot pounds of torque open or close these self-cleaning valves at any desired speed from one second to eight minutes according to requirements. Pressures range from 2 to 2500 psig and temperatures from minus 300° F. to plus 2000° F.

Such simplicity of design, adaptability and operating ease are the reasons why R-S Valves can be installed to control and shut off the volume and pressure of any material that flows or is forced through a pipe.

Obtain full details from your R-S representative.

R-S PRODUCTS CORPORATION
4600 Germantown Avenue, Philadelphia 44, Pa.
An S. Morgan Smith Company Subsidiary

DISTRICT OFFICES IN PRINCIPAL CITIES



PICTURE OF A *"Refinery Pump"*

"Refinery" pump? There ain't no such animal. But if one pump could be all things to all processes, it *might* look like this. Fact is, however, that in refining *it's pretty important to have each pump fitted to its specialized job.* No *one* answer is good for all.

That's why Byron Jackson builds job-engineered pumps. With a BJ you're sure of a pump that sizes up to the need and is pin-point engineered to profitable performance. Starting with more than 25 basic BJ pump designs used in the refinery field, BJ engineers can incorporate features to meet particular pressure, temperature, corrosive, material or power requirements.

When you need a pump for your refinery operation—check with BJ first!

Byron Jackson Co.

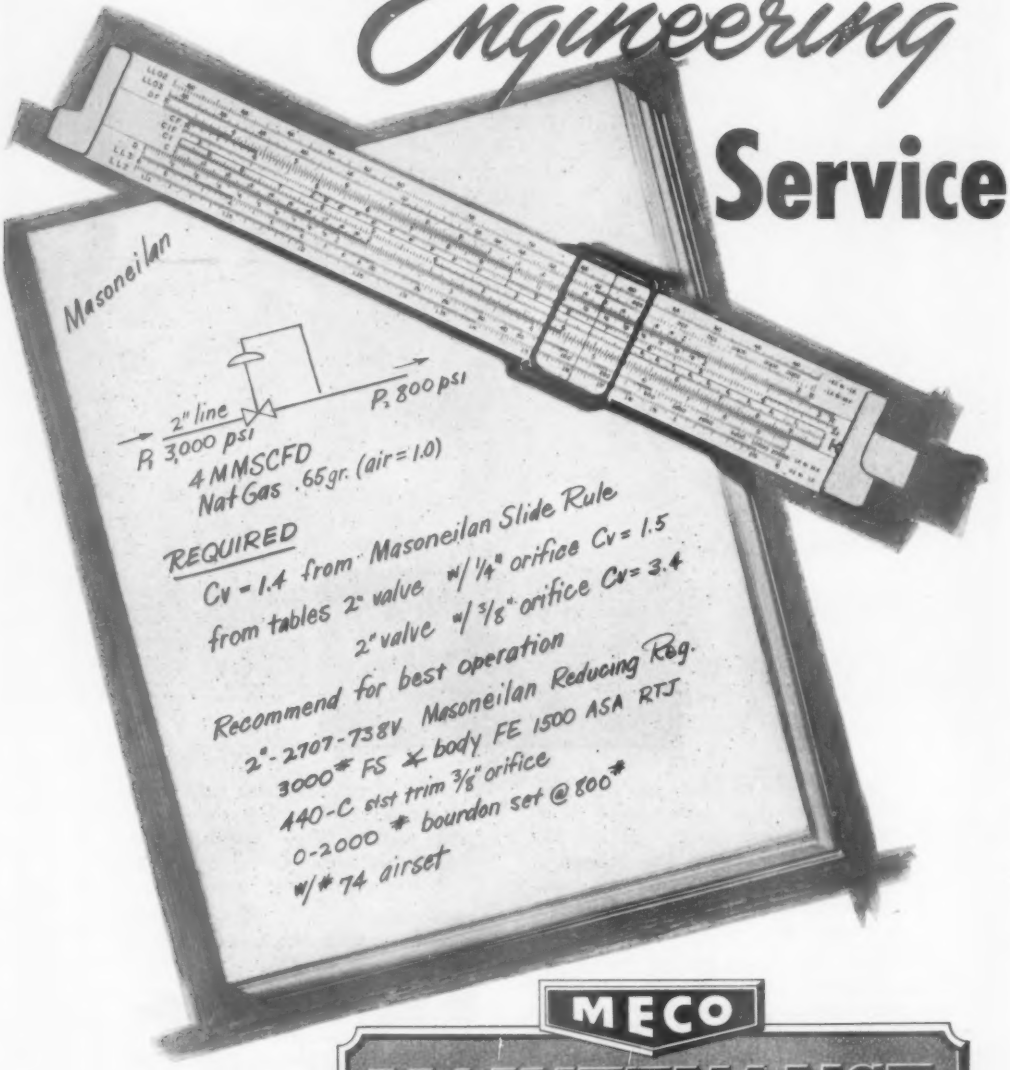
Since 1872

P. O. Box 2017 Terminal Annex, Los Angeles 54, Calif.

OFFICES IN PRINCIPAL CITIES

SEE **BJ** FOR THE **ENGINEERED** ANSWER TO YOUR PUMPING PROBLEMS

Equipment with *Engineering* Service


Masoneilan
2" line
P, 3,000 psi
P, 800 psi
4 MMSCFD
Nat Gas .65 gr. (air = 1.0)
REQUIRED
Cv = 1.4 from Masoneilan Slide Rule
from tables 2" valve w/ 1/4" orifice Cv = 1.5
2" valve w/ 3/8" orifice Cv = 3.4
Recommend for best operation
2"-2707-738V Masoneilan Reducing Reg.
3000# FS X body FE 1500 ASA RTJ
440-C 61st trim 3/8" orifice
0-2000 # bourdon set @ 800#
w/# 74 airset

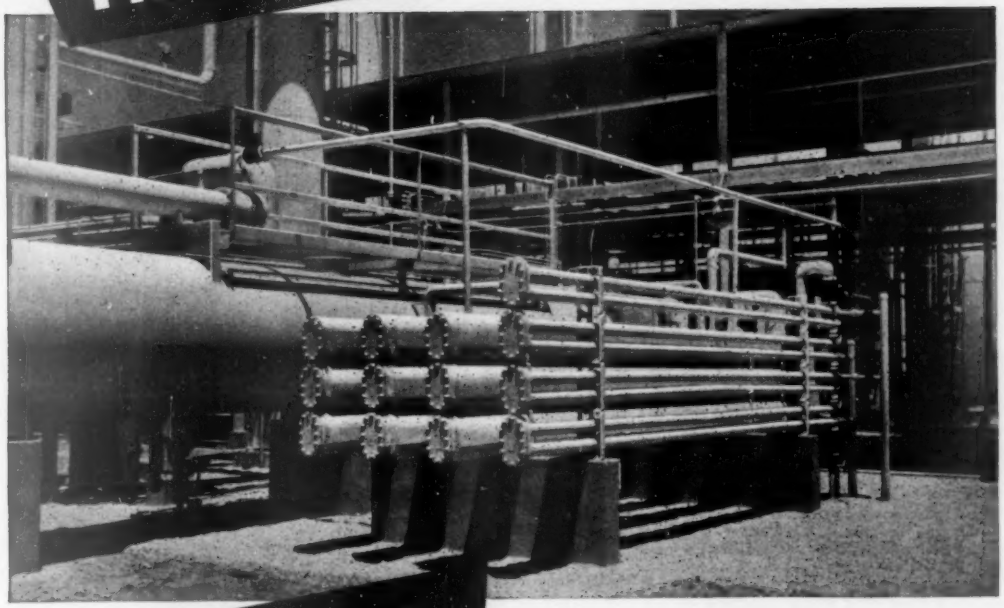
MECO

MAINTENANCE *Engineering* CORPORATION

P. O. BOX 2637

3711 CLINTON DRIVE
HOUSTON, TEXAS

Assure Flexibility in your plant



with **BROWN FINTUBE** *sectional hairpin heat exchangers*

● You'll get almost unlimited flexibility to meet changes in duties, plant re-arrangements, etc., with Brown Fintube Sectional Heat Exchangers. By simply adding a few sections to your existing exchangers, or removing a few sections, or changing the series-parallel manifolding, change-overs can be made easily and quickly. You can be operating *efficiently* on almost any new or different duty, on short notice, with a minimum of expense for new equipment, and without obsoleting any of your former facilities.

For utmost efficiency and economy use Brown Fintube Sectional Heat Exchangers throughout your plant. ***Write for Bulletin No. 481.***

THE BROWN FINTUBE CO.

Elyria, Ohio

Sectional Hairpin Heat Exchangers
Tank Suction and Line Heaters
Fintube Heaters for Bulk Storage Tanks
Indirect Process Air Heaters
Fintube Heaters for Processing Tanks
Integrally Welded Fintubes for Any Heating, Cooling or Heat Transfer Service

NEW YORK • BOSTON • PHILADELPHIA • WILMINGTON • PITTSBURGH • BUFFALO • CLEVELAND • CINCINNATI • DETROIT • CHICAGO
ST. PAUL • ST. LOUIS • MEMPHIS • BIRMINGHAM • NEW ORLEANS • TULSA • HOUSTON • LOS ANGELES • SAN FRANCISCO

You've got a Winning Combination

A STANDARD ISA FACE-TO-FACE DIMENSIONS
K "FLOW-LINE" CONTOURED BODY
Q STELLITED SEATING SURFACES
J RENEWABLE SELF-ALIGNING
10 SEAT RINGS EASILY REPLACED WITH VALVE IN PIPE LINE

with the New TRADE LESLIE MARK

DOUBLE SEATED DIAPHRAGM CONTROL VALVES

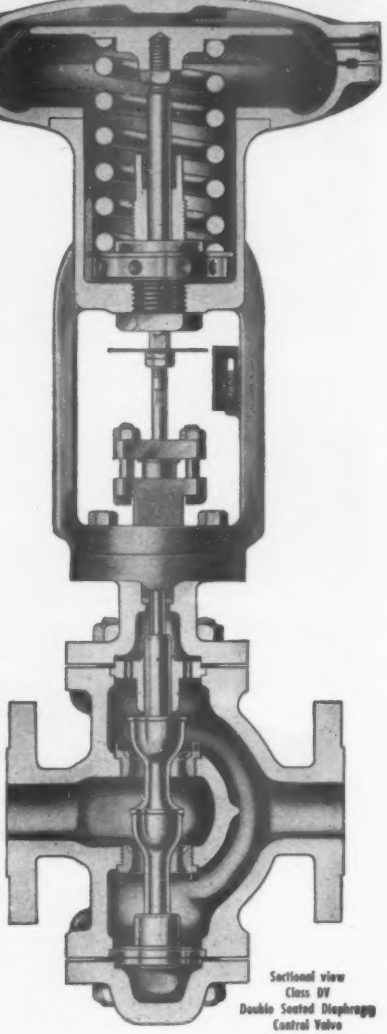
Calling a spade a spade you've got a "royal flush" of features in these new Valves designed for use with control instruments.

Their "Flow-Line" Contoured Bodies have ISA standard face-to-face dimensions and high capacity, low turbulence and minimum body pressure drop characteristics.

A new type, top and bottom guided construction is self-aligning and non-binding regardless of uneveness of bolt tightening.

Standard, integral stellited seating surfaces are recommended for steam service to reduce seat ring thread corrosion. Renewable, interchangeable seat rings also furnished where desired and may be easily replaced without removing valve body from the line. Elaborate grinding at high temperatures is completely eliminated.

With these Valves, you get as *standard equipment*, features heretofore only obtainable in expensive, specially designed valves.



Sectional view Class DV Double Seated Diaphragm Control Valve

Look for LESLIE REGULATORS under "Valves" or "Regulators" in your classified telephone directory in the following cities where LESLIE factory trained engineers are located:

Albany, N. Y. · Albuquerque, N. M. · Atlanta, Ga. · Baltimore, Md. · Beaumont, Tex. · Birmingham, Ala. · Boston, Mass. · Bridgeport, Conn. · Buffalo, N. Y. · Chicago, Ill. · Cincinnati, Ohio · Cleveland, Ohio · Dallas, Texas · Denver, Colo. · Des Moines, Ia. · Detroit, Mich. · El Paso, Tex. · Galveston, Tex. · Greenville, S. C. · Houston, Texas · Indianapolis, Ind. · Kansas City, Mo. · Kingsport, Tenn. · Los Angeles, Calif. · Louisville, Ky. · Memphis, Tenn. · Miami Springs, Fla. · Milwaukee, Wis. · Minneapolis, Minn. · Mobile, Ala. · Monroe, La. · New Orleans, La. · New York, N. Y. · Orlando, Fla. · Philadelphia, Pa. · Pittsburgh, Pa. · Ponca City, Okla. · Providence, R. I. · Richmond, Va. · Rochester, N. Y. · Rutherford, N. J. · Salt Lake City, Utah · San Francisco, Calif. · Seattle, Wash. · St. Louis, Mo. · Syracuse, N. Y. · Tucson, Ariz. · Wilkes-Barre, Pa. · Wilmington, Calif. · Youngstown, Ohio

Bruxelles-Forest, Belgium

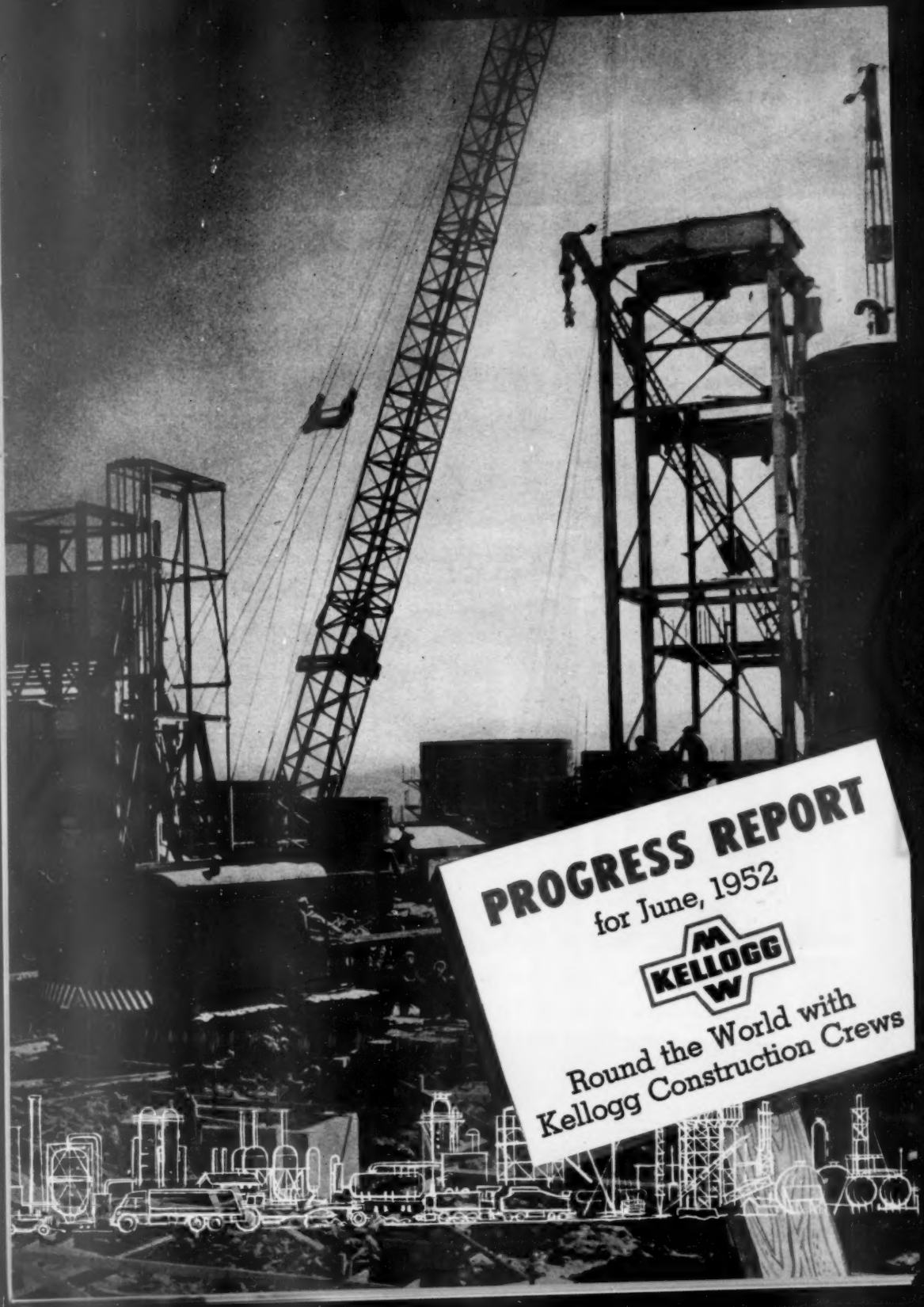
Montreal, Que., Can. • Ottawa, Ont., Can. • Toronto, Ont., Can. • Vancouver, B. C., Can. • Welland, Ont., Can.

WRITE FOR Bulletin 513

ESTABLISHED 1900 LESLIE CO.

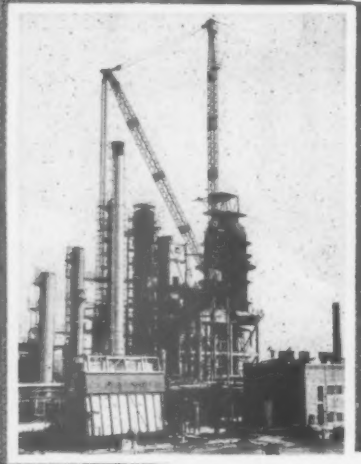
260 Grant Avenue, Lyndhurst, New Jersey

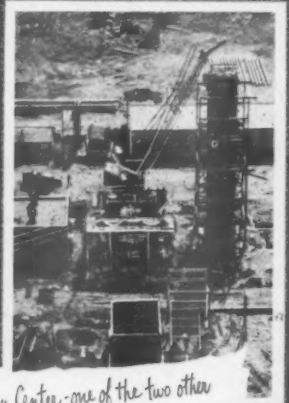
FLOATLESS LEVEL CONTROLS • PRESSURE REDUCING VALVES • PRESSURE CONTROLLERS
SELF CLEANING STRAINERS • PUMP GOVERNORS • TEMPERATURE REGULATORS
• AIR HORNS • STEAM WHISTLES


PROGRESS REPORT
for June, 1952
KELLOGG
Round the World with
Kellogg Construction Crews

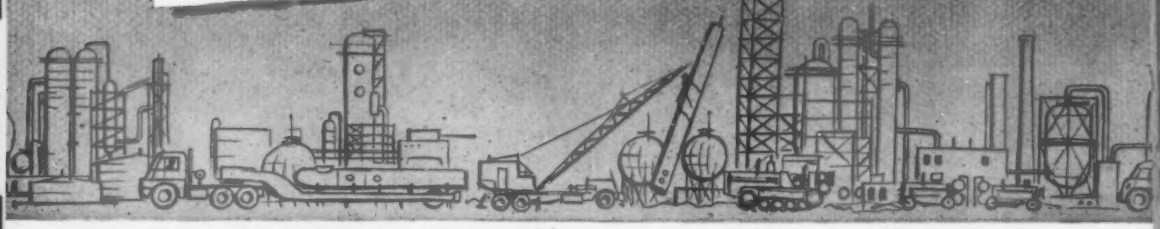
PROGRESS REPORT for June

On the Gulf Coast, foundations for the world's first Fluid Hydroformer are virtually complete. Pedestal in right foreground will support new-type, continuous, reaction and regeneration vessels. The compressor house is in the background.





In the British Isles, four major projects. Left - one Fluid cracker practically ready to go. Center - one of the two other crackers in advanced stages of construction. Right - shows the progress on fourth project: England's first propane deasphalter.



ROUND THE WORLD WITH KELLOGG CONSTRUCTION CREWS

1952...

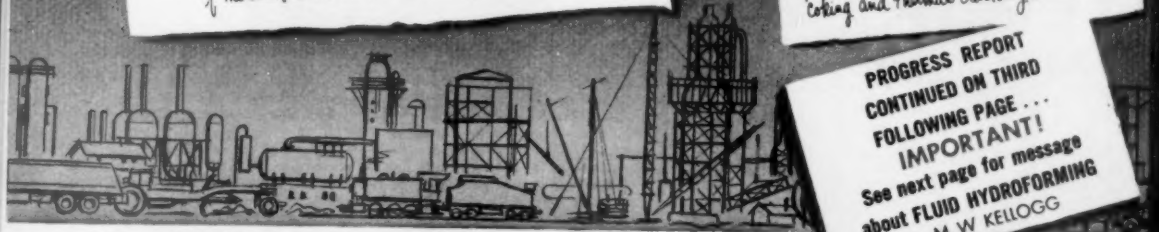
(PHOTOS SHOW ACTUAL FIELD CONDITIONS AS OF MAY 1, 1952)

KELLOGG

In Ontario, at press time, this Orthoflow was going on stream. Canada's second, it is one of seven Kellogg single-vessel units, built or in work, for domestic and foreign refiners. This cracker and the other processing equipment (including cat poly) operate off one control room, at the far right.

On the Canadian plains, improved weather conditions speed the completion of an important modernization program including a Fluid cracker. The 90-ton tower between the gas poles is being moved 300 ft. into the new coking and thermal cracking area.

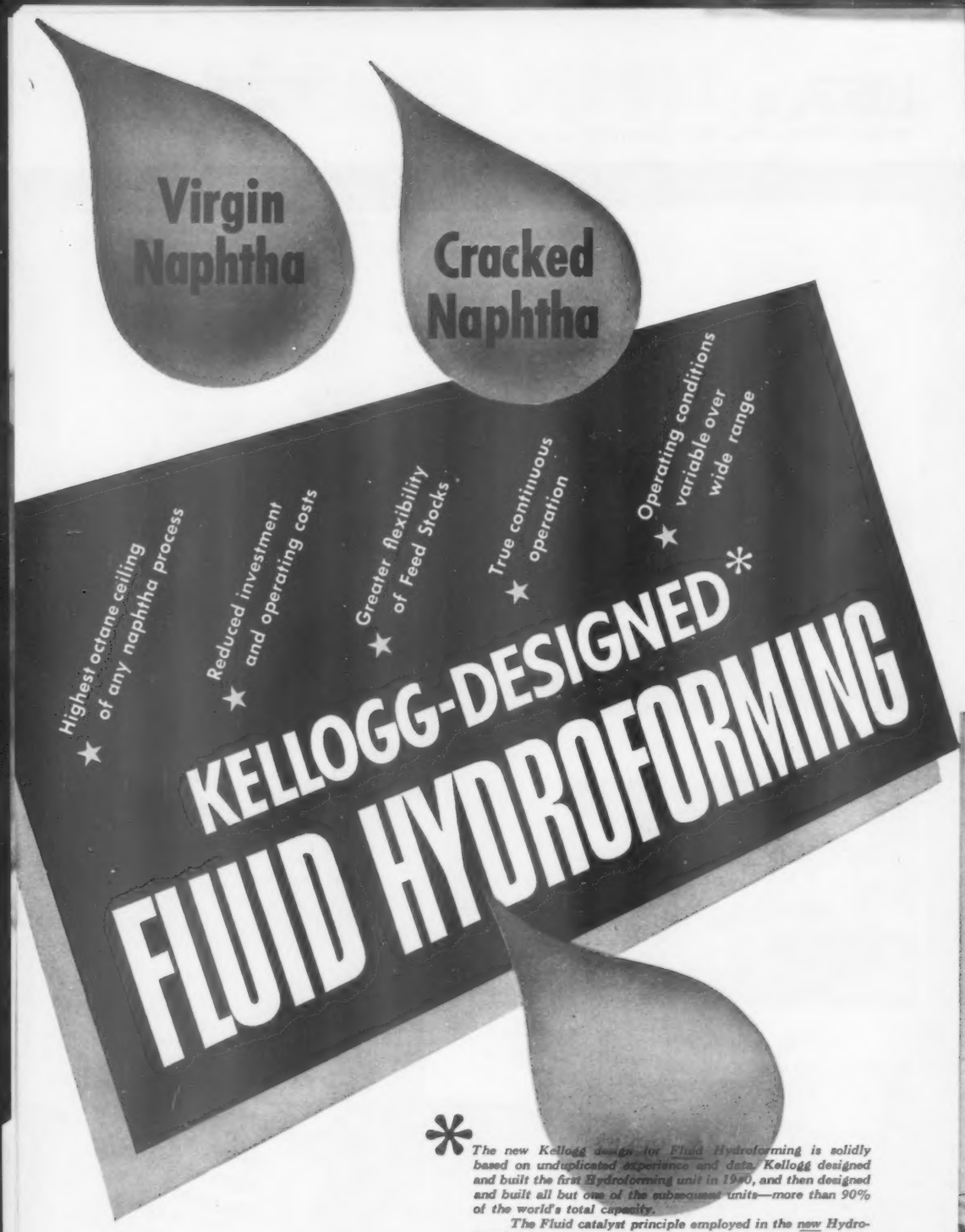
In the Southwest, foundation work for another Orthoflow cracker is just starting. Future location of the unit's converter is indicated by cross



PROGRESS REPORT
CONTINUED ON THIRD
FOLLOWING PAGE...

IMPORTANT!
See next page for message
about FLUID HYDROFORMING
M. W KELLOGG

ROUND THE WORLD WITH KELLOGG CONSTRUCTION CREWS



The new Kellogg design for Fluid Hydroforming is solidly based on unduplicated experience and data. Kellogg designed and built the first Hydroforming unit in 1940, and then designed and built all but one of the subsequent units—more than 90% of the world's total capacity.

The Fluid catalyst principle employed in the new Hydroforming process was rapidly brought into commercial use by Kellogg, as evidenced by the fact that more than 70% of the world's Fluid catalytic cracking capacity is Kellogg-engineered. Naturally, Kellogg has been in the forefront of the development of Fluid Hydroforming, has obtained much data from the company's pilot plants over a period of years and has access to all important data pertaining to the subject.

Greater Flexibility of Feed Stocks!

Fluid Hydroforming, the *modern* upgrading process, permits a wider range of feeds than other naphtha processes . . . from hexane (for benzene production) to kerosene. It is effective on virgin heavy naphthas, and especially so on high-sulphur cracked naphthas and on a mixed virgin-and-cracked feed.

Reduced Pre-Cracking

The *Fluid* catalyst, a finely-divided powder moving continuously through the system supported on oil vapors and air, provides improved catalyst-naphtha contact and hence improved reaction. And since operation is continuous, the system gives steady, uninterrupted production on any given feed.

Specifically, a 55 octane naphtha can be reformed into automotive gasoline stock with a clear octane rating of 95 CFR-R, which means a final aviation gasoline product with rich-mixture aviation octane ratings above 175, with the addition of 4.6 cc of tetraethyl lead.

Fluid Hydroforming produces higher octanes than any other process of its kind . . . at low operating costs . . . and, compared with fixed-bed Hydroforming, at considerably lower initial investment.

A Kellogg bulletin, "FLUID HYDROFORMING", gives detailed data on the comparative performance, yields and octane ceilings of the process. It will be mailed on request.

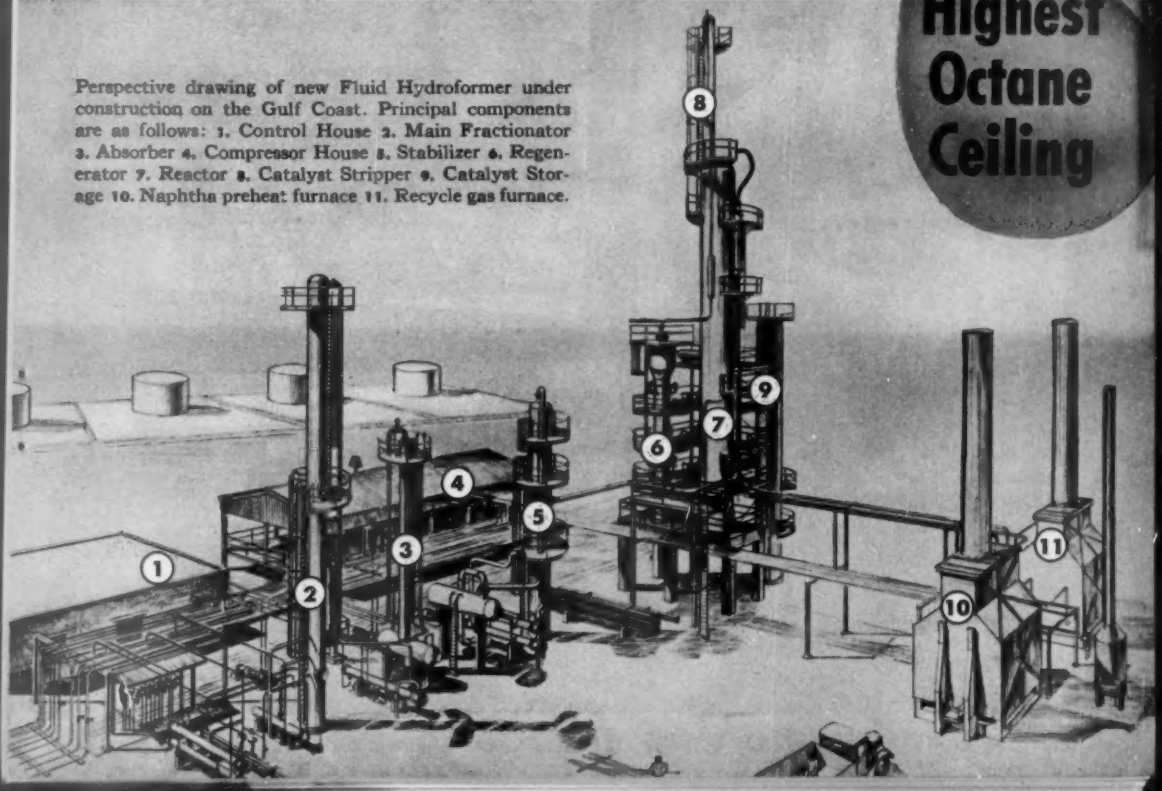
THE M. W. KELLOGG COMPANY

(A Subsidiary of Pullman Incorporated)

for fifty one years an integral part of refining progress!

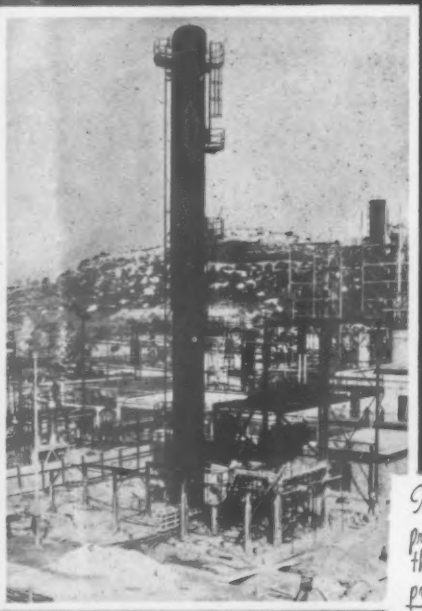
NEW YORK JERSEY CITY LOS ANGELES TULSA HOUSTON TORONTO LONDON PARIS

Highest Octane Ceiling



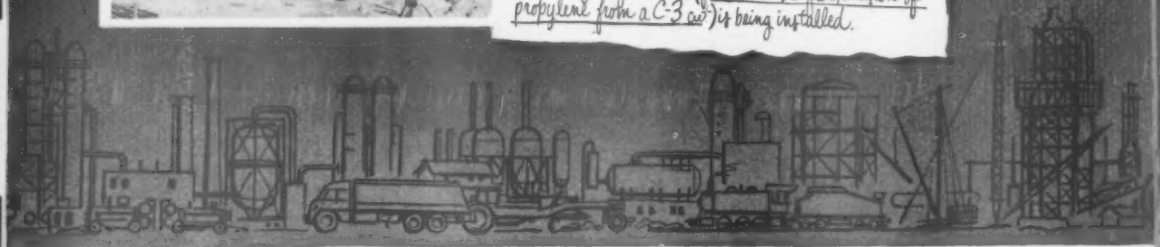
Perspective drawing of new Fluid Hydroformer under construction on the Gulf Coast. Principal components are as follows: 1. Control House 2. Main Fractionator 3. Absorber 4. Compressor House 5. Stabilizer 6. Regenerator 7. Reactor 8. Catalyst Stripper 9. Catalyst Storage 10. Naphtha preheat furnace 11. Recycle gas furnace.

PROGRESS REPORT for June



On the East Coast, piling is just about completed for another mammoth Kellogg cracker. With a reactor throughput of 63,000 BPD, it will be slightly larger than one Kellogg completed last year for the same refiner.

In Southern France, a refinery-wide modernization program has been underway for over a year. Currently, this many-trayed tower (for the close fractionation of propylene from a C-3 cut) is being installed.

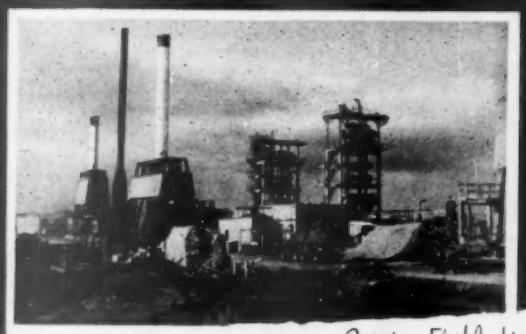


ROUND THE WORLD WITH KELLOGG CONSTRUCTION CREWS

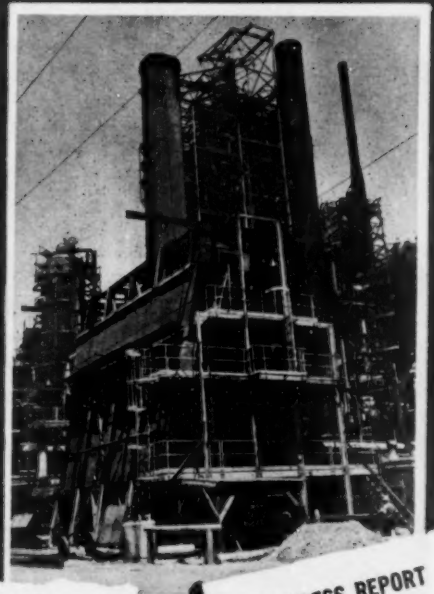
1952 . . . continued . . .

(PHOTOS SHOW ACTUAL FIELD CONDITIONS AS OF MAY 1, 1952)

In central Canada, two of the Dominion's largest individual refinery projects are well under way. This sweeping panorama of the entire construction area shows the sites for Canada's largest Fluid catalytic cracker, and its largest atmospheric and vacuum distillation unit



In Argentina, it's a complete 28,300-BPD refinery. Including Fluid Cracking Delayed Coking and Alkylation, the job is moving steadily along aided by special schools set up to train local craft workers.



Down in Texas, two of the country's earliest Fluid crackers are revamped. The construction of this Kellogg-designed A-frame furnace was part of the extensive project.

PROGRESS REPORT CONCLUDED ON NEXT PAGE

M. W. KELLOGG

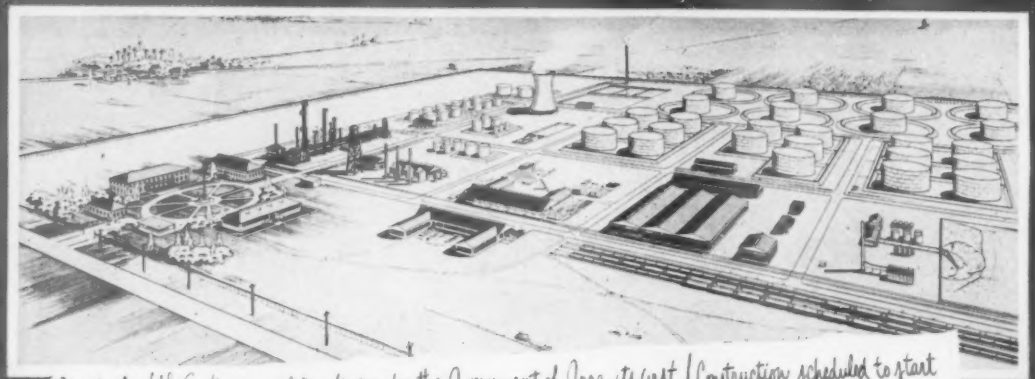
ROUND THE WORLD WITH KELLOGG CONSTRUCTION CREWS

(continued)

PROGRESS REPORT for June 1952

(PHOTOS SHOW ACTUAL FIELD CONDITIONS AS OF MAY 1, 1952)

KELLOGG



In the Middle East, a complete refinery for the Government of Iraq—its first! Construction scheduled to start later this year under Kellogg supervision

Out in Ohio, the site is cleared for another Orthoflow unit. Job includes considerable other new equipment as well as revamp work on existing units.

OTHER MAJOR CONSTRUCTION PROJECTS SCHEDULED

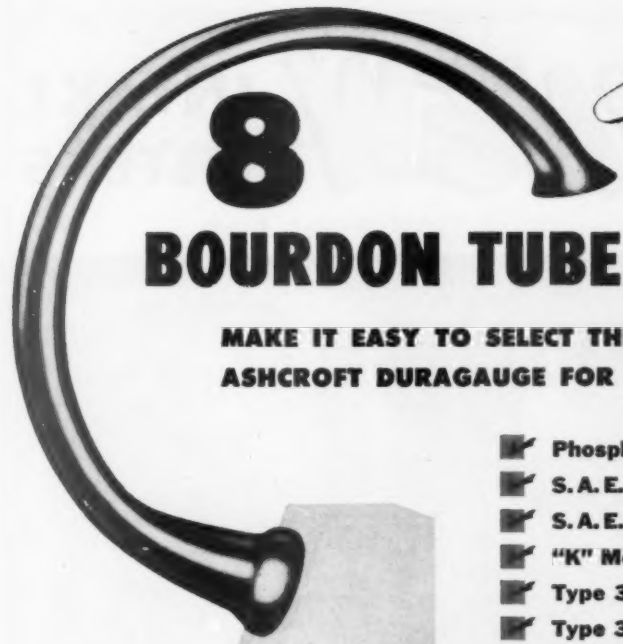
Alkylation Plant—*U.S. East Coast*
Ammonia Plant—*U.S. West Coast*
Cat Poly Units—*two, England and Italy*
Complete Thermal Refineries—
One for Chile; two for Brazil
Crude Distillation Units—*two, U.S. Southwest*
Deasphalting Unit—*U.S. Southwest*
Decarbonizing Unit—*U.S. Southwest*
Desalting Unit—*U.S. East Coast*
Fat Splitting Unit—*Norway*
Iso Octyl Alcohol Plant—*U.S. Mid West*
Olefin and Petrochemicals Plant—*Italy*
Orthoflow Crackers—*two,*
U.S. East Coast and Germany
Phenol Treating Unit—*U.S. Southwest*
Phthalic Anhydride Plant—*England*
Selexol Decolorizing and Fractionating Unit—*Norway*
Synthol Plant (Gasoline from Coal)—*South Africa*
Thermal Reforming Unit—*Italy*

In eastern Canada, construction of the world's first phenol-from-cumene plant is being pushed rapidly. At press time, foundation piling had just been completed and erection was under way.

SEE NOVEMBER ISSUE THIS PUBLICATION FOR NEXT PROGRESS REPORT

M. W. KELLOGG

ROUND THE WORLD WITH KELLOGG CONSTRUCTION CREWS



8 BOURDON TUBE MATERIALS

MAKE IT EASY TO SELECT THE RIGHT ASHCROFT DURAGAUGE FOR YOUR PARTICULAR NEEDS

- Phosphor Bronze
- S.A.E.4130X Alloy Steel
- S.A.E.4650 Alloy Steel
- "K" Monel
- Type 316 Stainless Steel
- Type 347 Stainless Steel
- Type 431 Stainless Steel
- Beryllium Copper

Service conditions and requirements determine what Bourdon Tube material is best in the pressure gauges you buy. To insure sustained accuracy and maximum durability in specific installations, Ashcroft Duragauges are available with Bourdon Tubes *in any one of the 8 listed materials.*

All Bourdon Tubes used in Ashcroft Duragauges are extra-wide—have greater sensitivity to slight pressure change. Pulsating pressures 50% higher than the tube rating remove any possibility of tube "set", and all tube joints are stress relieved after assembly. You can select with complete confidence that your Duragauges will serve accurately under the working pressures and corrosive conditions common to your operations.

Ashcroft Duragauges have other features important to you. The Nylon Movement* outwears all others. Unusually long tip travel assures greater accuracy of indication. The micrometer adjustment pointer can be reset while on the shaft. Precise recalibration of gauges in the field is easy. Sturdy lifetime cases, in a choice of materials, are available for stem, wall or flush mounting.

The nearby Ashcroft Distributor will gladly help you choose the right Duragauges for your particular service.

*Patented

1850 ASHCROFT U.S.A.

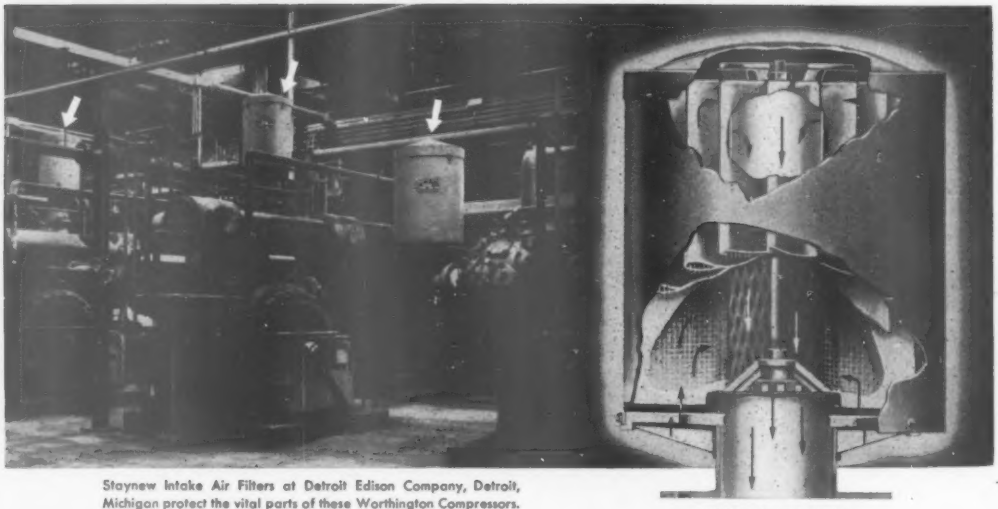
ASHCROFT GAUGES

MAXWELL MANNING M&M MOORE TRADE MARK

A product of **MANNING, MAXWELL & MOORE, INC.** STRATFORD, CONNECTICUT

MAKERS OF 'ASHCROFT' GAUGES, 'HANCOCK' VALVES, 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN' INDUSTRIAL INSTRUMENTS, BUILDERS OF "SHAW-BOX" CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES.

STAYNEW INTAKE FILTERS



Staynew Intake Air Filters at Detroit Edison Company, Detroit, Michigan protect the vital parts of these Worthington Compressors.

MODEL D Intake Filter

KEEP COMPRESSORS YOUNG!

Your air compressing equipment demands the protection Staynew Intake Filters are designed to give. With Staynew, compressors, and internal combustion engines, blowers, motors and generators remain at peak efficiency years longer.

Staynew's "Positive Protection" keeps shutdowns and repairs at an absolute minimum. And Staynew itself requires less attention. The *dry-type* filtering medium has the ability to remove air-borne dust particles without the necessity of viscous filter aids.

Staynew Intake Filters efficiently protect vital engine parts without carefully held maintenance schedules. And where noise is a problem, Model DS Silencer Filters are available. To keep equipment young, always specify Staynew.

Write today for Staynew Catalog S.I.F.

- Positive Protection
- Efficiency Actually Increases with Use
- Efficient Over a Wide Range of Loads
- Not Affected by Temperature Changes
- No Oil Carry-Over
- No Oil Blow-Out Over Free Air-Unloading Compressors

Representatives in Principal Cities

DOLLINGER PROTECTOMOTOR STAYNEW FILTERS

DOLLINGER CORPORATION

5 Centre Pk., Rochester 3, N. Y.

ALL TYPES OF FILTERS FOR EVERY INDUSTRIAL NEED

THESE
3 NON-METALLIC DISCS
can save you hundreds of valve dollars

Lunkenheimer "N-M-D" (Non-Metallic-Disc) Valves save you maintenance time and replacement money. Each disc is compounded for a special service — and all are easily interchanged or replaced. You're sure of the *right* valve for the job when you stock Lunkenheimer "N-M-D's."

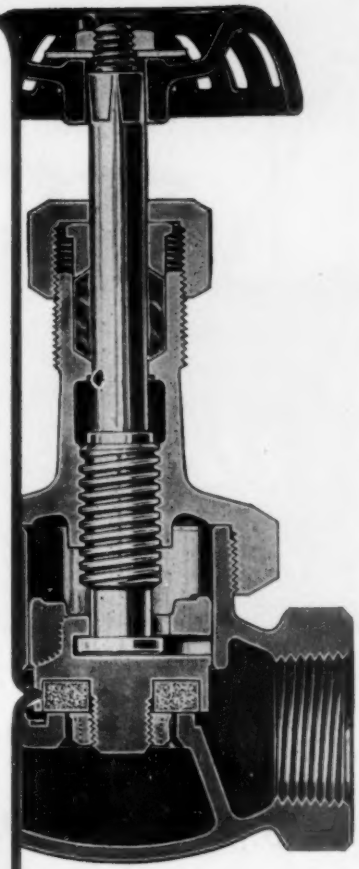
LUNKENHEIMER "N-M-D" Valves with No. 20 Discs handle 150 lb. saturated steam and hot water at pressures up to 300 lbs. and temperatures to 150°F. No. 20 Discs are designed for use on all Lunkenheimer "N-M-D" Globe, Angle, Check, and Quick Operating Valves where hot fluids are handled.

★

LUNKENHEIMER "N-M-D" Valves with No. 30 Discs are recommended especially for cold water, air, and gas service at pressures to 300 lbs. All Lunkenheimer "N-M-D" Valves can be converted from one service to another simply by exchanging the discs, which are identical in size and shape.

★

LUNKENHEIMER "N-M-D" Valves with No. 50 Discs are ideal for gasoline, oil, butane, and propane service. Disc-Holder for all "N-M-D" Valves is the slip-on type—four long guides prevent "cocking" and assure perfect disc seating. All three discs can be replaced or exchanged quickly.



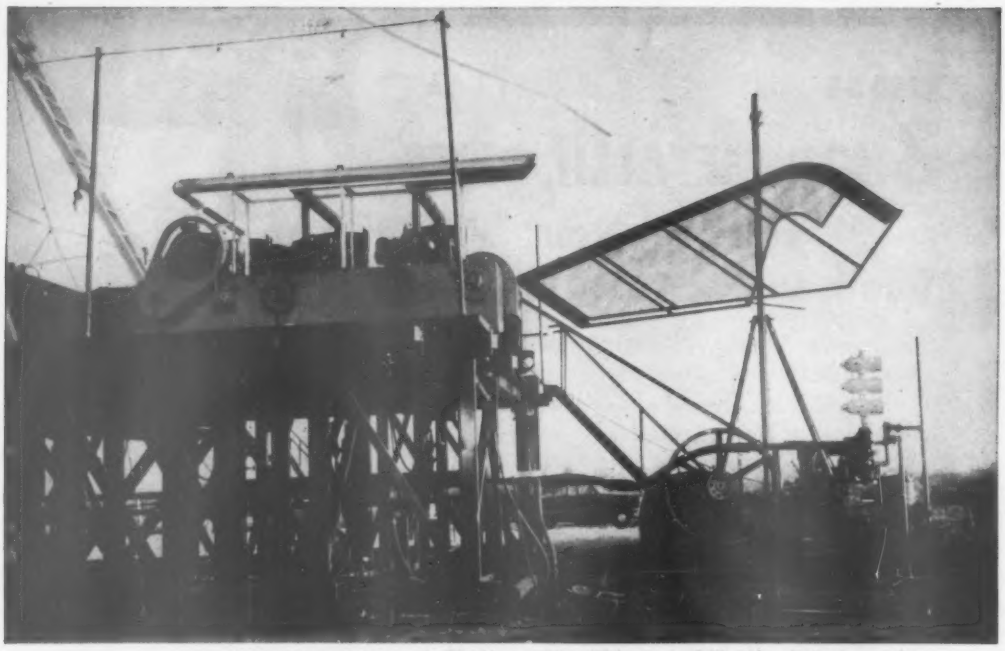
WRITE FOR Circular 558, which includes complete details, dimensions, and service recommendations. It is available from your distributor or from The Lunkenheimer Co., Box 360F, Cincinnati 14, Ohio.

BRONZE • IRON • STEEL

L-852-4

LUNKENHEIMER

THE ONE *Great* NAME IN VALVES



BORN IN THE OIL FIELDS, the Worthington QD sheave is first choice of all industry. Servicing rigs like this one is a much easier job since the QD became available—it's easier to get on, easier to get off, yet always tight on the shaft. And you can get the sizes you need QUICKLY!

We built it to your specifications

Yes, it was the demands of oil production men like you that gave the Worthington QD* sheave its start. Today *all* industries use it. In fact it's the *most widely used* hub-and-rim combination in existence. Why?

IT'S STRONGER because each size is individually designed for the load it has to carry. Not just *one* standard design for all sizes.

IT'S EASIER TO GET ON—lightweight split hub is clamped to shaft, then heavier taper-bored rim is easily slipped over and press-fitted to hub.

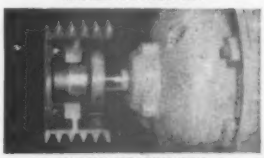
IT'S EASIER TO GET OFF—long pull-up bolts serve as jack screws to remove rim, hub stays put so that there's no realignment problem.

IT'S QUICKLY AVAILABLE—Local distributors in all oil-field areas are stocked-up in most sizes and they're backed up by factory stocks in Los Angeles, Fort Worth, Houston, Tulsa and New Orleans.

IT'LL PAY YOU TO STANDARDIZE on the Worthington QD*. Worthington Corporation, formerly Worthington Pump and Machinery Corporation, Multi-V-Drive Sales Division, Buffalo, N. Y.

*Reg. U. S. Pat. Off.

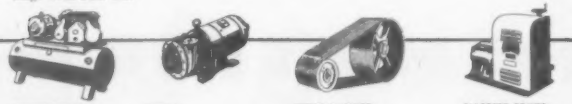
EASIER TO GET ON



EASIER TO GET OFF

YET ALWAYS TIGHT ON THE SHAFT

MV.2.8



COMPRESSORS: AIR-COOLED, WATER-COOLED
PUMPS: CENTRIFUGAL, ROTARY, STEAM, POWER
MULTI-V-DRIVES: QD SHEAVES AND V-BELTS
ALLSPEED DRIVES: WORTHINGTON ALLSPEED

Buy these Worthington standard products from your local distributor

WORTHINGTON
Multi-V-Drives

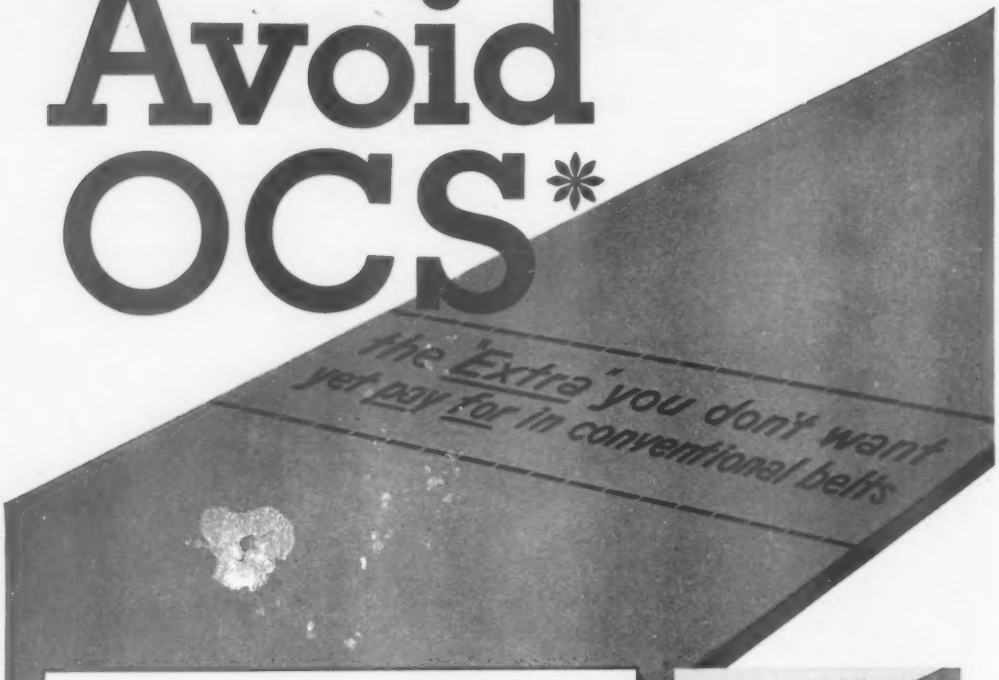
Precision Control.....

FOR THE PETROLEUM INDUSTRY

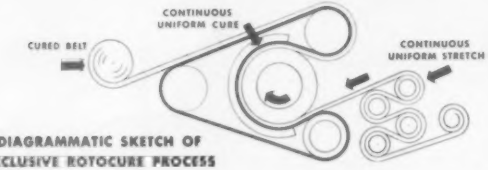
Illustrated is a
Woodward type PG Governor
with pneumatic-hydraulic speed adjustment
for use in combination
with air instruments for all types of
control in which the controlled variable is a
quantity other than speed.

GOVERNOR COMPANY
FORD, ILLINOIS, U.S.A.

Avoid OCS*



Rotocure eliminates this cause of transmission belt failure



DIAGRAMMATIC SKETCH OF
EXCLUSIVE ROTOCURE PROCESS

*Overcured Sections — present every 30' to 40' in all belts made by the flat press method.

When you buy a transmission belt, your money entitles you to a belt *uniformly cured throughout.* But you don't get it, you *can't get it* with belts made by conventional flat press methods!

Here's what happens in flat press curing: belt segments every 30 to 40 feet are overcured because of press overlaps — sections cured earlier advance *less than a full press length.* The "double treatment" results in a series of weakened structures about 2" to 4" wide. They're "breakdown breeders."

You won't find these Achilles heels in BWH *ROTOCURED* TRANSMISSION BELTS! They're made by continuous, constant-motion curing. Every inch of the belt receives a uniform, *single* curing. Every inch of the belt is *uniformly strong.*

BWH Rotocured Belts cut your costs also because they permit operation at lower tension. Overall you get:

1. Increased belt life (up to 40%)
2. Elimination of mechanical distortion at the press ends
3. Constant, uniform stretch
4. Uniform, abrasion-resistant covers

Get the complete story from your BWH distributor who knows a good thing when he sees it—for *you.* Ask him also about BWH Conveyor Belts —another cost-cutter because they're made by the Rotocure process of uniform, endless curing.

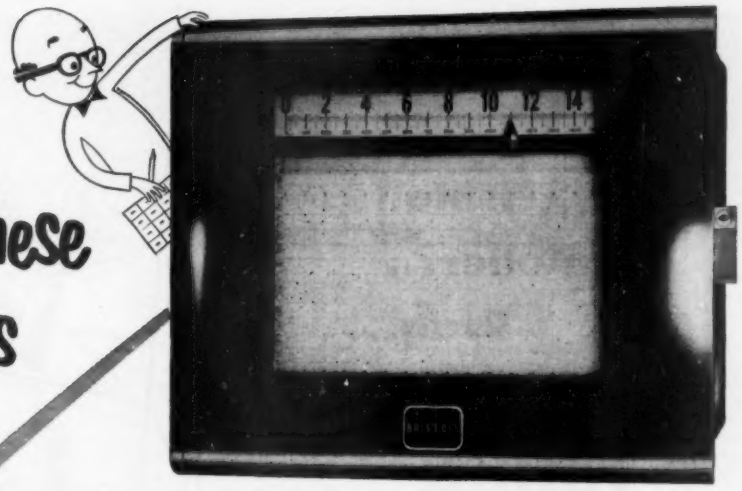
BWH
DEPENDABLE RUGGEDNESS

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

Warehouse Stock: 111 N. Canal St., Chicago, Illinois **Distributors in all Principal Cities**

PLANT: CAMBRIDGE, MASS. · P. O. BOX 1071, BOSTON 3, MASS., U. S. A.



Check these features OF THE BRISTOL DYNAMASTER

—the electronic master-mind for your measuring, recording and controlling problems

✓ Continuous-balancing electronic circuit responds instantly to minute changes

✓ All types of electric and air-operated controllers offered

✓ Available as a self-balancing bridge or potentiometer

✓ Trouble-free operation

✓ Electronic component uses vacuum tubes available at any radio supply house

✓ Full-scale pen travel in 7, 3 or ⅔ seconds

✓ Chart speeds from ¾ in. per hour to 7200 in. per hour

✓ Multiple recorders up to 16 points

✓ Components interchangeable and easily replaced on all Dynamaster models

✓ Immune to most vibration or shock

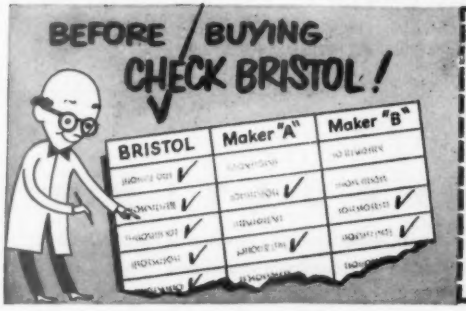
✓ Exceptionally unaffected by stray currents (1000 to 1 discrimination).

BRISTOL

FOR DETAILED PROOF *of the sensitivity, versatility and reliability of the electronic Dynamaster, use the coupon or write for Catalog P1245.*

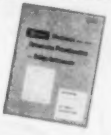
The dependable Guidepost of Industry

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS



THE BRISTOL COMPANY
120 Bristol Road
Waterbury 20, Conn.

Please send catalog giving details of Dynamaster performance to:



NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

Fishtail...
Roller...
Drag...

AIRCO HARDFACE-LIFTING ADDS SUB-SURFACE TIME

More than twenty Airco Hardfacing rods are ready to help you beat today's replacement delay. Full equipment protection with Airco Hardfacing Alloys . . . for new parts and old . . . keeps you free of cut-backs, or loss of day to day production.

Parts and tools — fishtail bits . . . roller bits . . . core heads . . . wall scraper blades . . . drag type bits — stay on the job longer, even at peak production, their life extended many times with *Airco Hardfacing Alloys.*

No matter what your wear problem, it will pay you to look into Airco Hardfacing Alloys for your tools and parts. Any Airco representative will be glad to give you complete information. Write your local Airco office today or address Air Reduction Sales Company, Advertising Department, 60 East 42nd Street, New York 17, N. Y.

AT THE FRONTIERS OF PROGRESS YOU'LL FIND AN AIR REDUCTION PRODUCT

AIRCO®

DEALERS AND OFFICES IN PRINCIPAL CITIES

AIR REDUCTION

AIR REDUCTION SALES COMPANY • AIR REDUCTION MAGNOLIA COMPANY • AIR REDUCTION PACIFIC COMPANY

REPRESENTED INTERNATIONALLY BY AIRCO COMPANY INTERNATIONAL

DIVISIONS OF AIR REDUCTION COMPANY, INCORPORATED

Edward GAGE VALVES

Male Inlet and Female Outlet in Popular ½ Inch Size or Female Inlet and Outlet in Sizes ⅛ Inch Through 1 Inch . . . Forged Steel Body

Popular Edward forged steel gage valves are now available with male inlet and female outlet in the half-inch size at attractive prices. Other details of these new valves are identical to the widely used Edward gage valves with female connection on both ends.

The male inlet does away with nipples—as for example, when hooking up pressure gages to pressure tubing and casing. Illustration in box below and left shows typical money-saving installation. Male inlet (machined from drop forged body) has extra heavy wall thickness for high pressures...prevents possibility of breaking off or rupturing. Overall compactness make Fig. 152J and 153J desirable for cramped areas.

Fig. 152J and 152 series described below is ideal for service on Christmas trees, meter, dead end, instrument and other small pipe lines, for pumps, vents, separators, Diesel and gas engines, etc.

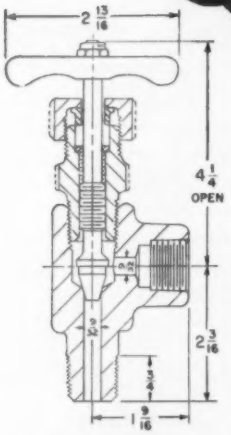
Conservatively rated at 4000 lb at 150F or 600 lb at 750F. Available in either globe (Fig. 152J) or angle (Fig. 153J) design.

PRICE DATA

Size	*Fig.*	*List Price Each*
½ in.	152J	$7.50
½ in.	153J	$8.25

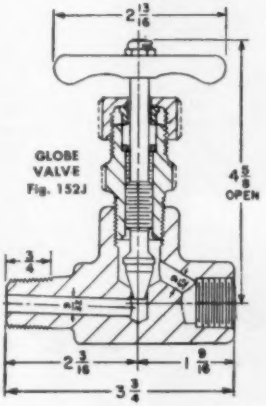
CHECK THIS EXCLUSIVE COMBINATION OF FEATURES

1. Forged steel body for greatest possible strength and soundness.
2. Heavy duty, accurately aligned male inlet. Clean cut, tapered threads.
3. Long taper semi-needle EValloy 13% chromium stainless steel stem-disk with fine pitch thread for close, positive regulation. Backseating shoulder for repacking under pressure.
4. Extra broad seat joint for tight sealing.
5. Taper threaded joint between bonnet and body prevents bonnet backing out of valve.
6. Contoured T-handle provides for easy finger tip control.
7. Bonnet and packing nut EValized (plated) to reduce galling and corrosion.
8. EValpak asbestos packing die-formed for perfect fit and tight seal in high temperature or high pressure service. Treated to prevent stem pitting.



ANGLE VALVE
Fig. 153J

EDWARD FIG. 152J GLOBE GAGE VALVE IN ONE OF MANY INSTALLATIONS ON CHRISTMAS TREE.

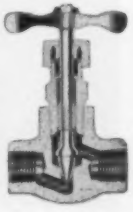


GLOBE VALVE
Fig. 152J

Weight—lb.
153J—1 lb, 14 oz.
152J—1 lb, 14 oz.

Drop forged for greatest strength. Since 1916, Edward has been doing its own die designing and sinking, forging and heat treating—all under rigid metallurgical department supervision. Properly designed forged and heat treated valve parts give greatest strength at critical points.

FIG. 152 SERIES—Identical in design features to 152J series except 152 series has female inlet and outlet and is available with either carbon steel, 13% chromium stainless steel or 18-8 stainless steel bodies. Angle or globe style available. Sizes ⅛"—1". Used in same services as bar stock valves but offer greater advantages.



Prices subject to change without notice

Edward Valves, Inc.

Subsidiary of ROCKWELL MANUFACTURING COMPANY

EAST CHICAGO, INDIANA

1492 West 145th Street

These tubes go in to stay!

Thanks to CHASE ANTIMONIAL ADMIRALTY

(a patented alloy)

Here's the reason Chase Antimonial Admiralty* keeps heat exchanger tubes on the job year after year:

They've got *enough* antimony to resist dezincification. And antimony will not affect the metal's grain structure and won't weaken the tube.

When you get Chase Antimonial Admiralty Condenser Tubes, you're getting metal that *stays tough* . . . stands up under heavy stresses . . . lasts for years.

Years of use have proved Chase Antimonial Admiralty's superiority.

*U. S. Pat. No. 2,061,921

Special stocks of
ANTIMONIAL ADMIRALTY
Condenser Tubes in Chase Warehouses:
NEW YORK, BALTIMORE, NEW ORLEANS
LOS ANGELES
also carried by—
Vinson Supply Co., Tulsa
Standard Brass & Mfg. Co., Houston

Chase BRASS & COPPER

WATERBURY 20, CONNECTICUT • SUBSIDIARY OF KENNECOTT COPPER CORPORATION

• *The Nation's Headquarters for Brass & Copper*

Albany†	Cincinnati	Kansas City, Mo.	New York	San Francisco
Atlanta	Dallas	Los Angeles	Philadelphia	Seattle
Baltimore	Denver†	Milwaukee	Pittsburgh	Waterbury
Boston	Detroit	Minneapolis	Providence	(Factory
Chicago	Houston†	Newark	Rochester†	office only)
Cincinnati	Indianapolis	New Orleans	St. Louis	

MOTOROLA MICROWAVE

WORKING SYSTEMS

Spanning a thousand-mile crazy-quilt of mixed topography, through a devil's brew of weather extremes from desert sun to sub-arctic blizzards, through sleet, torrential rains, hurricane, tornado, and fire, Motorola Microwave on more than one occasion has stood alone as the only remaining means of communication.

27 Motorola systems are now working around the clock for pipe lines, air lines, State Police and Industry, carrying multi-use channels—— ——loaded with voice, teleprint, telemeter, and point-to-point tie-in with the Motorola VHF 2-way mobile radio networks.

27 Systems In and Working
— Saving Time and Cost for the Owners —
Can Do The Same For You In Your Operation!

Mid Valley Pipeline Co. (1000 miles)
Texas Illinois Natural Gas Pipeline Co. (1000 miles)
Aeronautical Radio, Inc.
Hawaiian Air Lines
City of Dayton
Shell Pipeline Co.
Panhandle Eastern Pipeline Co.
Pan American Pipeline Co.
Michigan State Police
State of California

***Remember!* Experience Counts Especially in Microwave**

24 Years of Leadership in Mobile Radio

Motorola Microwave

Communications and Electronics Division

4545 AUGUSTA BLVD. • CHICAGO 51, ILLINOIS

In Canada: Rogers Majestic Electronics, Ltd., Toronto, Canada

WRITE MOTOROLA MICROWAVE
4545 AUGUSTA BLVD., CHICAGO 51, ILLINOIS

The Freedom to Grow

HERE the venturer may start upon his dream with stars in his eyes — for all the small in this great land have the freedom to grow big.

The humblest vendor of today can become tomorrow's merchant prince and his cart a towering castle filled with wares of all the world.

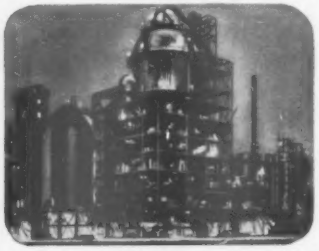
For the way was fashioned in the creed of men whose foresight is our fortune and whose concept of the American way was that the individual be free.

It is a concept that has made America's industries great and their greatness has made America strong.

Today, The Texas Company looks back fifty years upon a birthplace as primitive as the wagon of the vendor. Its forebears believed in freedom: the right to make their own choices, to run their own risks, to suffer of their own errors and to gather their own rewards.

Asking neither subsidy nor security, and knowing they would prosper only in proportion to the manner in which they served — a homely philosophy, but it is the bedrock of the American way, as solid as the ledge beneath the loam of our land.

For it has given America the most powerful sinews of all the nations of the world.



THESE PICTURES were merely dreams fifty years ago when The Texas Company was born — a tiny newcomer in the realm of the giant.

Today, it is a leader in its field; in fact, the seventh largest among the great business organizations of America. Its rise is a moral in itself — an inspiration to all the young and small of business — kindling for the fires that light the eyes of every endeavoring American.

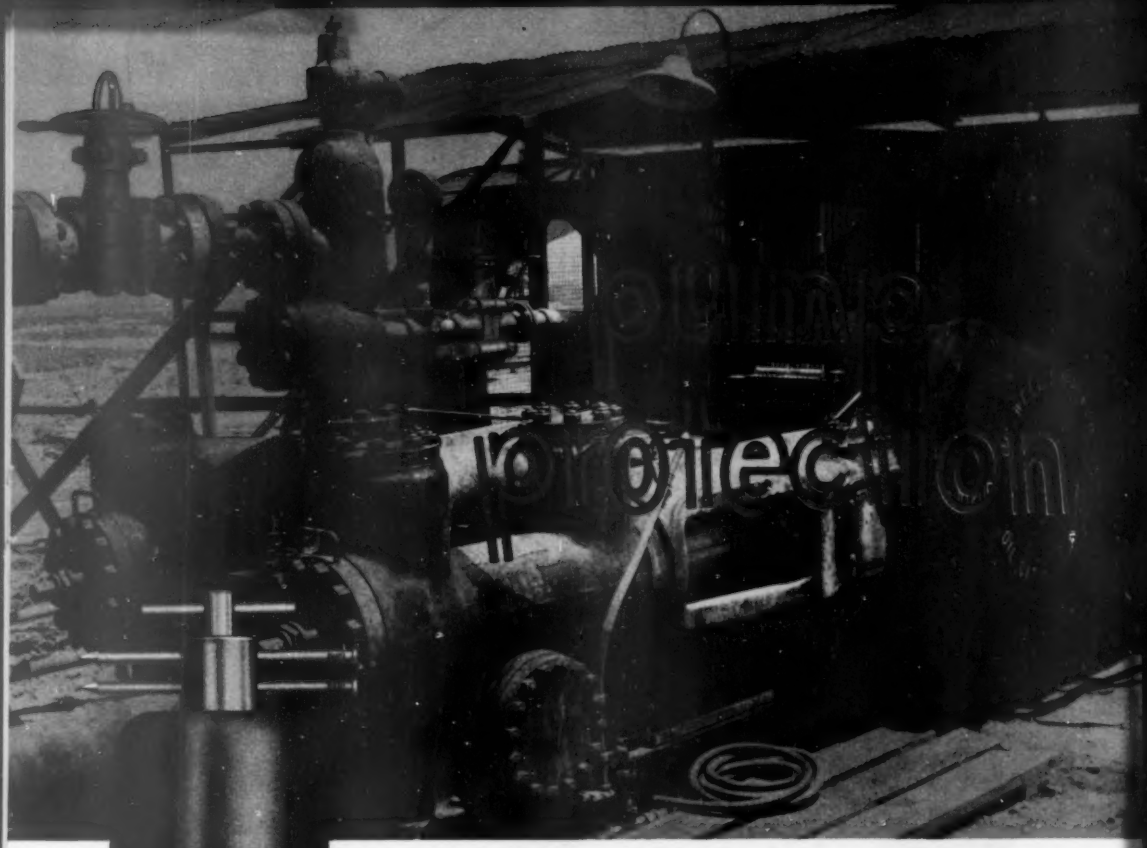
For how did it grow? Because it was born in this broad land where the lowliest may climb to the peak of ambition's loftiest pinnacle; and because Freedom of Enterprise stood by its side and whispered encouragement.

America's industries are symbols of America's strength; and, like the biceps of the healthy and the strong, bespeak the wisdom of our way.

THE TEXAS COMPANY TEXACO 1902-1952

Faithfully Yours for Fifty Years

Published by The Texas Company on its FIFTIETH ANNIVERSARY

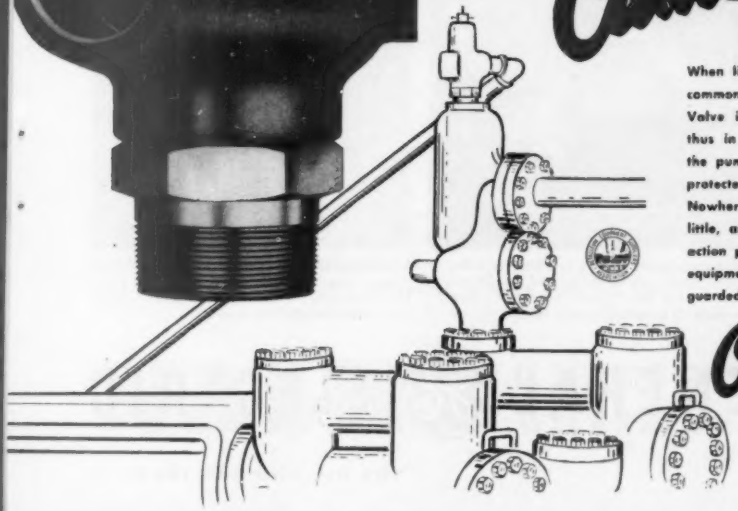


... for the price of a common nail

Cameron

SHEAR-RELIEF VALVES

When line pressures exceed a predetermined value, a common nail in the stem of the Cameron Shear-Relief Valve is sheared, allowing the valve to fully open, thus in a split second the entire mud line system—the pumps, rotary hose, and all connections—are thus protected against damage from abnormal pressures. Nowhere else can you buy so much protection for so little, and maintenance is low since the instantaneous action prevents cutting of the seat. Check your drilling equipment now to make sure that it is being safeguarded by these dependable relief valves.



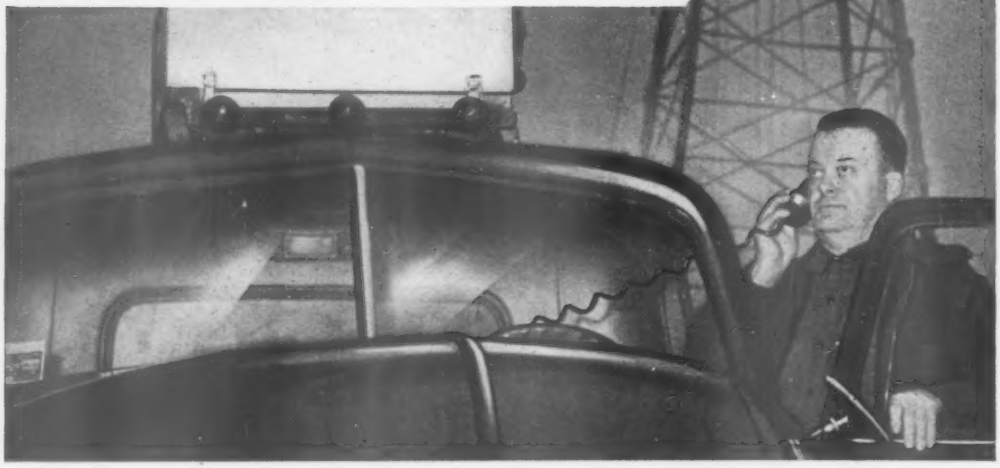
Cameron IRON WORKS, INC.

P. O. BOX 1212 • HOUSTON, TEXAS

Export Office: 74 Trinity Place, New York, N. Y. • Sterling Area: British Oil Field Equipment Co., Ltd., Duke's Court, St. James's, London S.W.1. England • California: Cameron Iron Works of California, Box 267, Long Beach • Canada: Cameron Iron Works of Canada, Ltd., 9860-88th Ave., Suite 3, Edmonton, Alberta.

SELLING THROUGH SUPPLY STORES

G-E RADIO CONTROL SPEEDS REPAIRS ON NATURAL GAS PIPELINE



GAS LEAKS in a 240-mile pipeline can be expensive, especially if the line runs through mountainous country. But by spotting the leaks quickly, then summoning repair crews by radio, pipeline operators can save miles of deadhead driving and hundreds of manhours.

In western Pennsylvania, the Trans-Penn Transit System produces and pipes natural gas to its distributing customers. To prevent long shutdowns due to breaks in the line, the company employs G-E 2-way radio units in trucks and supervisory vehicles, as well as at drilling rigs and compressor stations. This high-speed communication system helps three repair crews do the work of four with less effort, less waste motion.

General Electric's CAS* man at the G-E office near you can demonstrate how to cut communication costs in *your* business. Call him today. There's no obligation. *General Electric Company, Electronics Park, Syracuse, N. Y.*

*Communications Advisory Service

Isolated compressor station is "on the air" at any time with radio. Operator sends pressure reports at specific intervals, receives orders from headquarters 60 miles away, instantly.

Radio-equipped trucks, carrying supplies or repair crew, can be dispatched rapidly to any spot on the line. Quick transfers of men or equipment cut maintenance costs.

In action less than a year, G-E radio system is already worth many times its cost to this pipeline management. Winter or summer, the radio units are unaffected by weather.

GENERAL ELECTRIC

This Simple Compressor Meets the Complex Needs of a Changing Petroleum Industry

It's the Nash!

Here is a compressor presenting advantages found in no other device. Nash Compressors have only one moving part, rotating without metallic contact with the pump casing. No internal lubrication is required. Yet they produce 75 lbs. pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure.

There are no valves, gears, pistons, sliding vanes, or other complicated wearing parts in a Nash. Compression is secured by an entirely different principle of operation. Because of this, gas pumping problems difficult with ordinary pumps are often easily handled by the Nash. For example, Nash Pumps are standard equipment in the Synthetic Rubber Industry, where they have met the needs of new and difficult processes.

Nash Compressors are compact and save space. They run without vibration, and compression is without pulsation. They maintain original performance over long periods. Service is assured by a nationwide net-work of Engineering Service offices. Instructive bulletin shows how they operate. Write for it.

One moving part.

No internal wearing parts.

No valves, pistons, or sliding vanes.

No internal lubrication.

Low maintenance.

Slugs of liquid entering pump do no harm.

Non-pulsating pressure.

Saves floor space.

75 pounds in a single stage.

NASH ENGINEERING COMPANY

274 WILSON, SO. NORWALK, CONN.

Applications Unlimited...

wherever you need to measure,

. . . choose

ElectroniK

Potentiometers

WHETHER charting the course of an experiment on a laboratory bench, or regulating huge-scale production in a sprawling processing plant, *ElectroniK* Potentiometers point the way to accelerated research, to greater productivity, to higher quality, and to lower costs.

Versatile *ElectroniK* Instruments are supplied calibrated for variables such as pressure, temperature, level, flow, pH, conductivity, speed and motion. A wide selection of instruments provides a choice of indicators, single and multi-point recorders, and a variety of electric and pneumatic

PRECISION INDICATOR

centralizes up to 48 different readings on one instrument; just press a button and wide-open scale turns quickly to measured value.

INDICATING CONTROLLER

set point and measured values are easily read on 2½-foot circular scale. Supplied for on-off and proportional electrical control.

H
HONEYWELL

● *Important Reference Data...*

record or control

controllers from the simplest to the most complex types. In all these, the *ElectroniK* "continuous balance" measuring system, with electronic non-cyclic balancing, affords the peak of speed, sensitivity and service-proved dependability.

Plan now to gain the full benefits of automatic instrumentation throughout your plant. Call in your local Honeywell engineer . . . he is as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4488 Wayne Avenue, Philadelphia 44, Penna.

Of special interest to research men . . .

FUNCTION PLOTTER

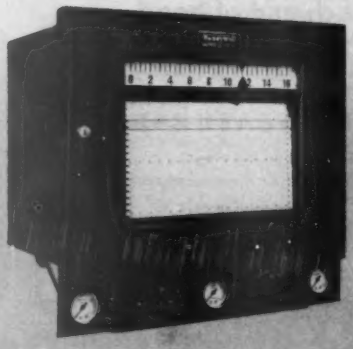
automatically charts temperature vs. expansion, speed vs. torque, stress vs. strain. One variable actuates the pen, the other actuates the chart drive.

DUPLEX RECORDER

simultaneously records any two independent variables. Two pens actuated by separate measuring systems can both travel full width of the chart.

ELECTROMETER

records currents as small as 10^{-15} amperes, for measurements with ionization chambers, spectroscopes, etc.; features fast response, low noise, high stability.



Recorders

Circular chart type with 28⅝" scale can be read at a distance. Strip chart type records as many as 16 points. Scanners available for larger number of points. Pen speeds as fast as one second.

Electric Controllers

Circular chart and strip chart types are supplied for on-off and proportional control . . . Electr-O-Line for position-proportioning, Electr-O-Pulse for time-proportioning.

Pneumatic Controllers

Choice includes on-off control, Limited Throttlor and Full Throttlor controllers with manual reset, Air-O-Line Controller with automatic reset. Rate action is optional.

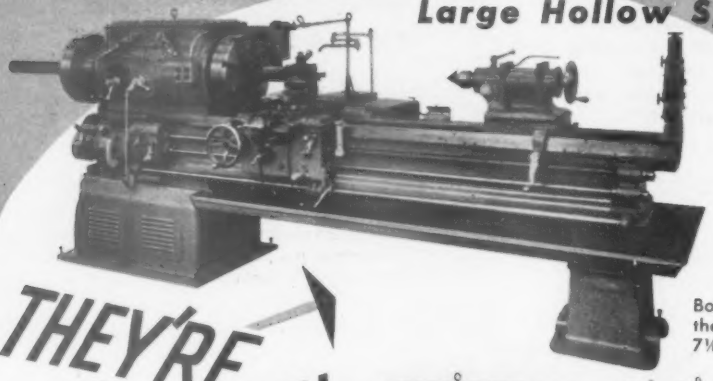
MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS
First in Controls

For a brief description of all Honeywell instruments, write for Composite Catalog 5000.

FOR FASTER PRODUCTION, BETTER WORK, LOWER COSTS—

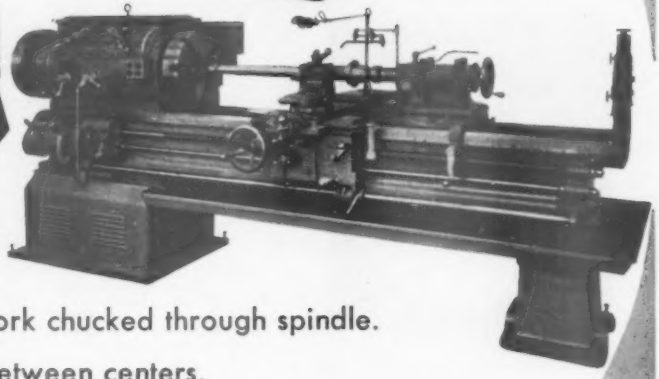
HYDRATROL LATHES

Large Hollow Spindle Type



Both Illustrations Show the 18" Hollow Spindle 7⅛" Hole

THEY'RE VERSATILE!



- Machine long work chucked through spindle.
- Machine work between centers.
- Also built with beds and carriages on each end of headstock for machining both ends of a shaft at one time.

SIZES 18" TO 36"

Small — 18" & 20" up to 7⅛" Hole
Medium — 25" up to 12" Hole
Large — 32" & 36" up to 16⅛" Hole
(Standard Type Lathes 16"-36")

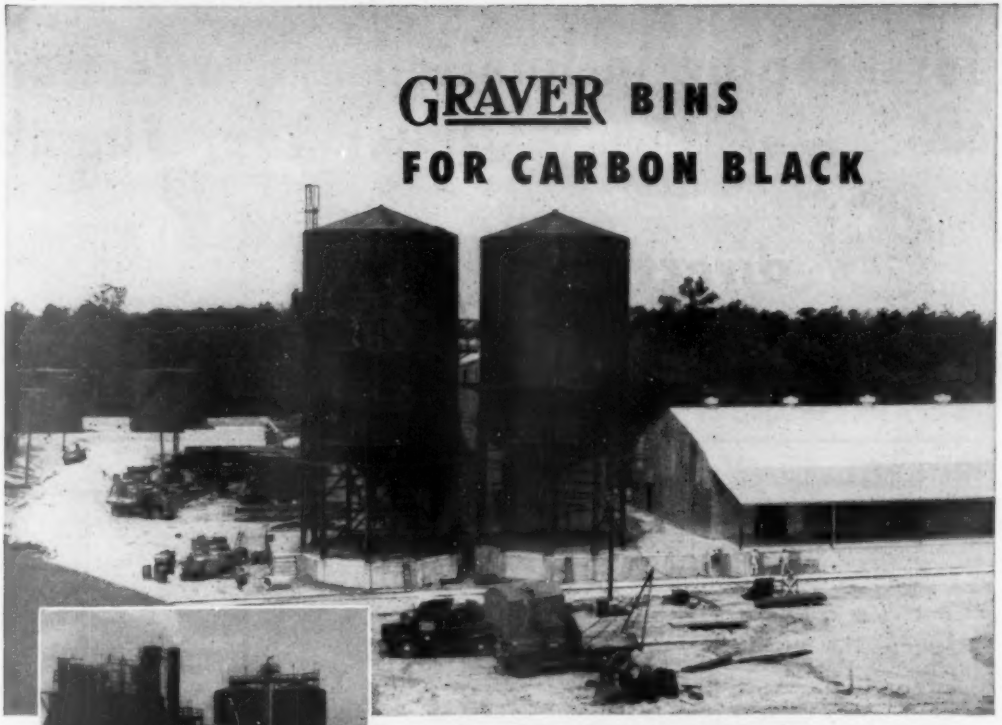
IMPORTANT FEATURES

Timken Bearing Spindles.
Hydraulic clutches for forward and reverse, controlled from apron or headstock.
Hydraulic brake for close position control.
Hydraulic clutches self-compensating. No adjustment and full power capacity at all times.

LEHMANN MACHINE COMPANY

CHOUTEAU AT GRAND • SAINT LOUIS 3, MISSOURI

GRAVER BINS FOR CARBON BLACK



Equipped with the most modern processing machinery and centralized controls, this great plant of the Continental Oil Black Co. requires only 29 employees to produce annually 25,000,000 lbs. of high abrasion furnace black, which is marketed by the Witco Chemical Company to the rubber and paint industries. Utilizing gas, oil, process water and emergency steam from the nearby Continental Oil Refinery, the plant represents industrial planning of a high order and operating excellences of such a level that the highest quality products are produced.

A joint operation of the Continental Carbon Co. and the Continental Oil Co., this new plant of the Continental Oil Black Co. was engineered and built by United Engineers & Constructors Inc of Philadelphia.

AT WITCO - CONTINENTAL'S NEWEST OIL BLACK PLANT IN WESTLAKE, LOUISIANA

Now producing high abrasion furnace black at the rate of 25,000,000 lbs. a year, this plant — the most modern in the industry — is the latest addition to the great petroleum and chemical installations in the Lake Charles area.

For this plant, Graver supplied the tankage for the oil feed stocks to be processed and the bins to receive the finished product. The pair of Graver-built bins, of cone roof and cone bottom design, each measure 30′ in diameter by 38′ 4″ high with a total storage capacity of 1,500,000 lbs. of oil black.

In view of the high standards exercised by the Continental Oil Black Co. in the choice of equipment, Graver is pleased to have supplied the process tankage for this notable installation.

GRAVER TANK & MFG. CO., INC.

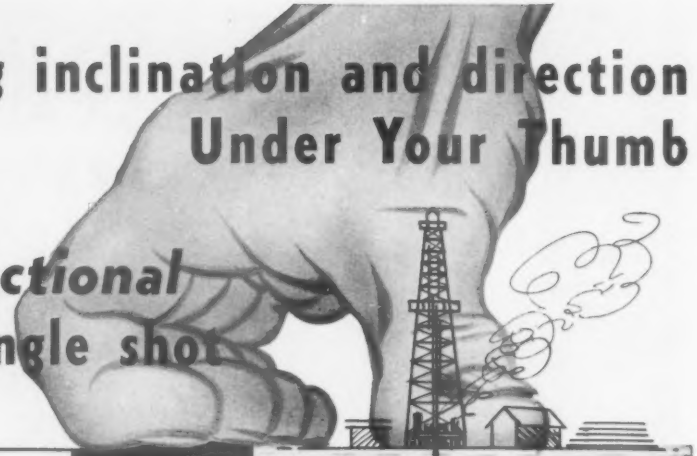
EAST CHICAGO, INDIANA

NEW YORK • CHICAGO • PHILADELPHIA • WASHINGTON • DETROIT
CINCINNATI • CATASAUQUA, PA. • HOUSTON • SAND SPRINGS, OKLA.

GRAVER

for keeping inclination and direction Under Your Thumb

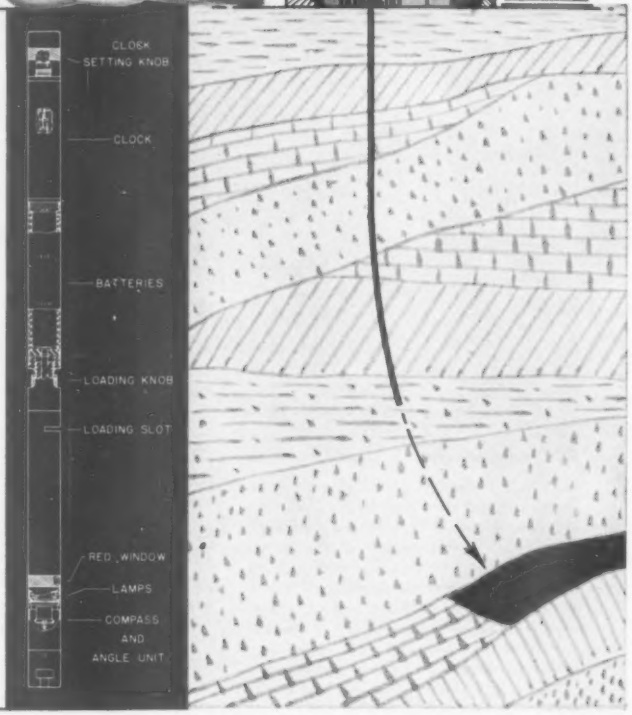
directional magnetic single shot



This new Sperry-Sun survey instrument, available on a rental basis, is used primarily on drilling wells and provides a record of the inclination and direction of uncased wells at any desired depth.

Permanent and extremely accurate records are available within a few minutes after the instrument comes out of the hole . . . *allowing you to keep inclination and direction under your thumb.*

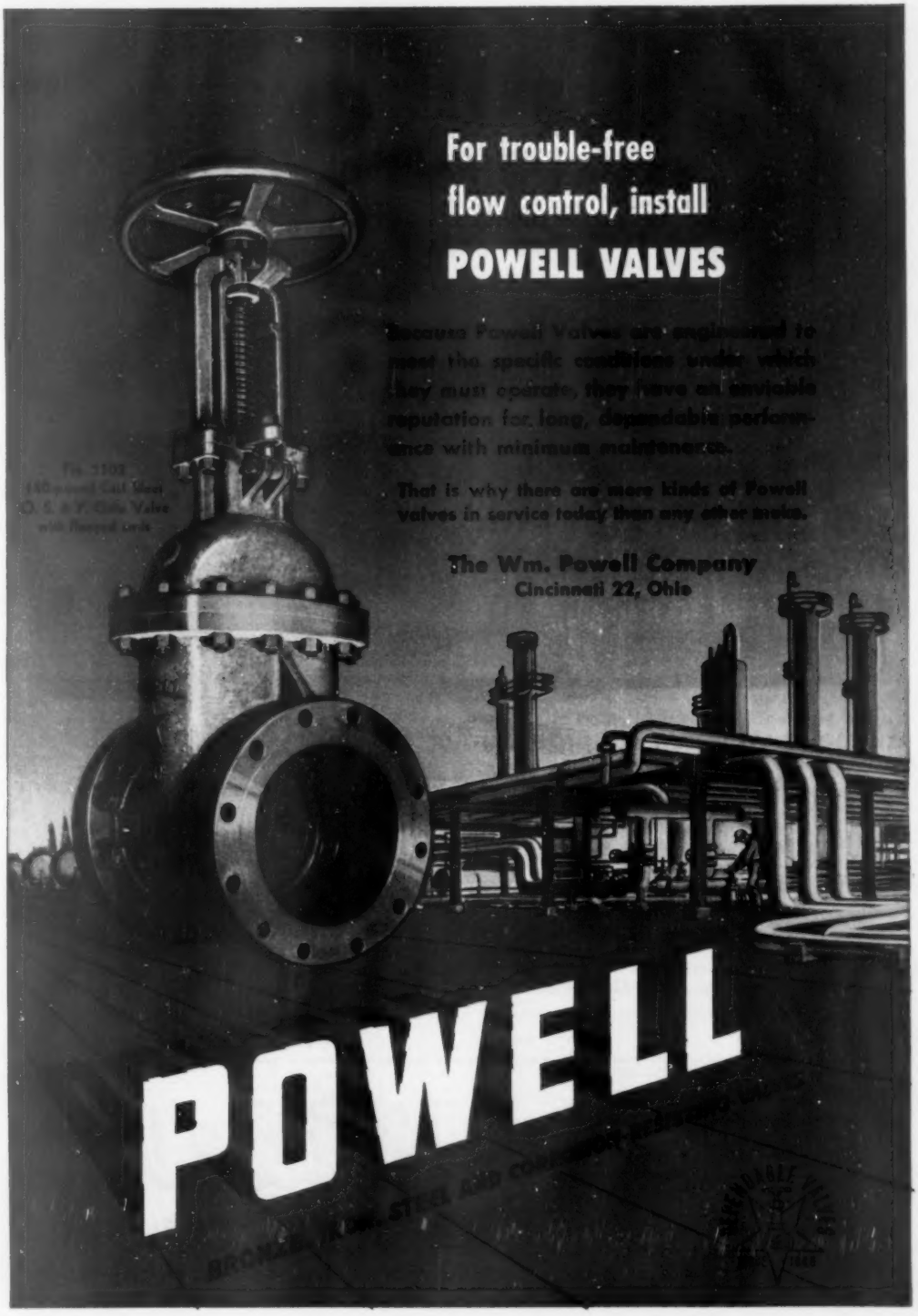
You'll find these other Sperry-Sun services and products invaluable and reasonable: Surwel Underground Surveying Service, E-C Inclinometer, Syfo Clinograph, Non-Magnetic Drill Collar Rentals, and Polar Core Orientation.



SPERRY-SUN WELL SURVEYING COMPANY

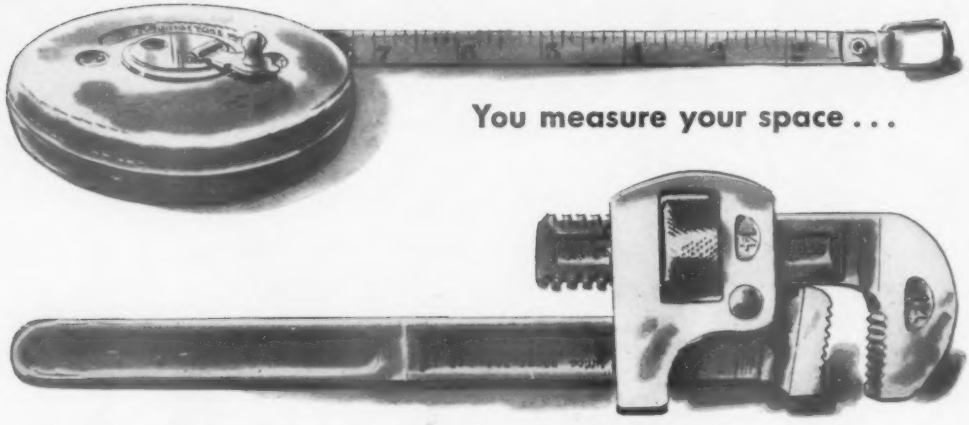
3118 BLODGETT AVENUE HOUSTON, TEXAS

Philadelphia, Pa. Falfurrias, Texas Odessa, Texas Marshall, Texas Long Beach, Calif. Oklahoma City, Okla. Lafayette, La. Bakersfield, Calif. Moulden Oil Field Services, Casper, Wyo. Cresswille, Illinois


For trouble-free
flow control, install
POWELL VALVES
Because Powell Valves are engineered to meet the specific conditions under which they must operate, they have an enviable reputation for long, dependable performance with minimum maintenance.
That is why there are more kinds of Powell valves in service today than any other make.
The Wm. Powell Company
Cincinnati 22, Ohio
POWELL

NEW! NOW!

SIX PRE-PACKAGED CO_2 FIRE EXTINGUISHING SYSTEMS TO FIT YOUR SPECIFIC NEEDS!



You measure your space . . .

anybody who can cut pipe can install them

Here's inexpensive built-in carbon dioxide fire protection against normal flammable liquid and similar industrial hazards.

The new Kidde Standard Pak is a ready-made, pre-engineered fire extinguishing "package" for volumes up to 6,000 cubic feet. Anyone who can cut pipe can install it. Each kit contains dependable Kidde rate-of-rise heat detectors, efficient Kidde Multi-jet nozzles, and automatic discharge heads. Paks are supplied with or without pipe and fittings. Optional accessories include pressure trips and switches, remote controls, sirens, gongs.

A choice of six sizes assures you of the right package for your particular requirements. For complete information send us coupon below.

Please send me details on the New Kidde Packaged Fire Extinguishing System

NAME_____

FIRM NAME_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

Kidde

Walter Kidde & Company, Inc.

654 Main Street, Belleville 9, N. J.

Walter Kidde & Company of Canada, Ltd., Montreal, P. Q.

AMERICA'S LEADING INDUSTRIES PUT THE STAMP OF APPROVAL ON KIELEY & MUELLER CONTROL VALVES

Make It Your Business to Find Out Why!

All over the country leading companies in the process industries are solving tough problems with K & M control valves, designed especially for precise and positive control by instrumentation.

More and more, as the outstanding performance of these superbly engineered valves becomes known, important companies with pressure and flow applications are turning to K & M for the skill, knowledge and experience that assure reliable automatic control of pressures, temperatures, rates of flow and liquid levels.

There is a qualified K & M representative near you, eager to discuss your control problems and able to provide the most satisfactory solution.

This extremely accurate circular slide-rule type K & M valve capacity calulator includes correction scales for steam quality, liquid and gas specific gravity and a flowing temperature scale for gases. Sent without charge in response to a request on your business stationery.

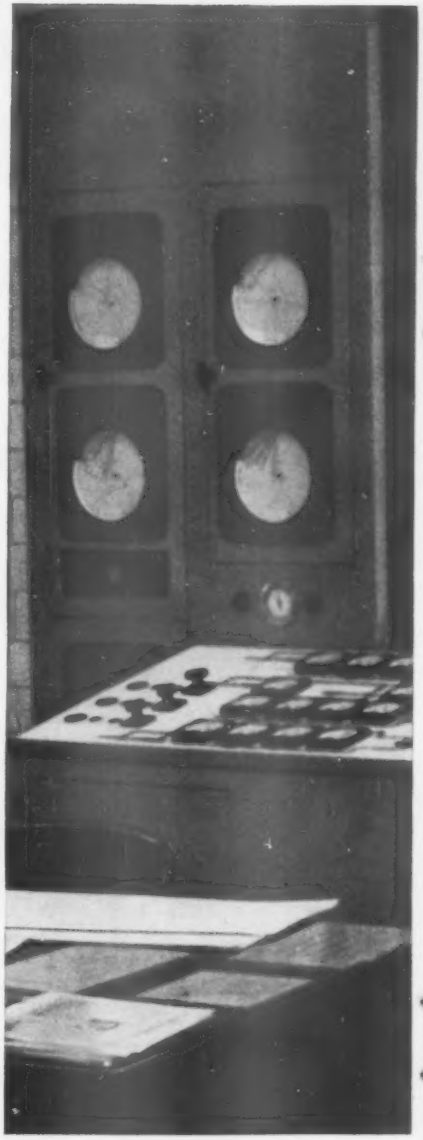
K&M

KIELEY & MUELLER, INC.

Valve Makers Since 1879

2033 - 43rd STREET NORTH BERGEN, N. J.

Here's how Power System Planning pays off for Plantation Pipeline



When Plantation's line was first built in 1941, Westinghouse worked with them in planning the electrical control system. So many of the ideas paid off in lower maintenance, system flexibility and reduced power costs that the new expansion program incorporates many of these ideas along with some new ones developed between our engineers and theirs. Here are a few of the outstanding features.

Use little more power despite doubled capacity

The new parallel line doubles system capacity but power requirements have increased only slightly. One important way this was done was by preventing extra charges for peak power loads. When the load reaches the upper limit, a flow-control valve automatically cuts it back.

Highly mechanized system

Another feature was the use of automatic controls wherever possible. As a result, the big expansion increased man power needs very little. For example, if abnormally high pressures or temperatures should develop, special equipment automatically shuts down the pumps or sounds a warning.

Radically new instrumentation system

Westinghouse engineers also helped develop a new instrumentation system for the pumping stations. This system using electrical strain gauges permits the use of standard electrical instruments to show pressure. This eliminates the disadvantages of pressure tubing, with its hazards of high-pressure leaks. It also simplifies instrument mounting and permits a simplified compact control board for system operation. These instruments are also more accurate than conventional gauges.

Call Westinghouse early on YOUR next project

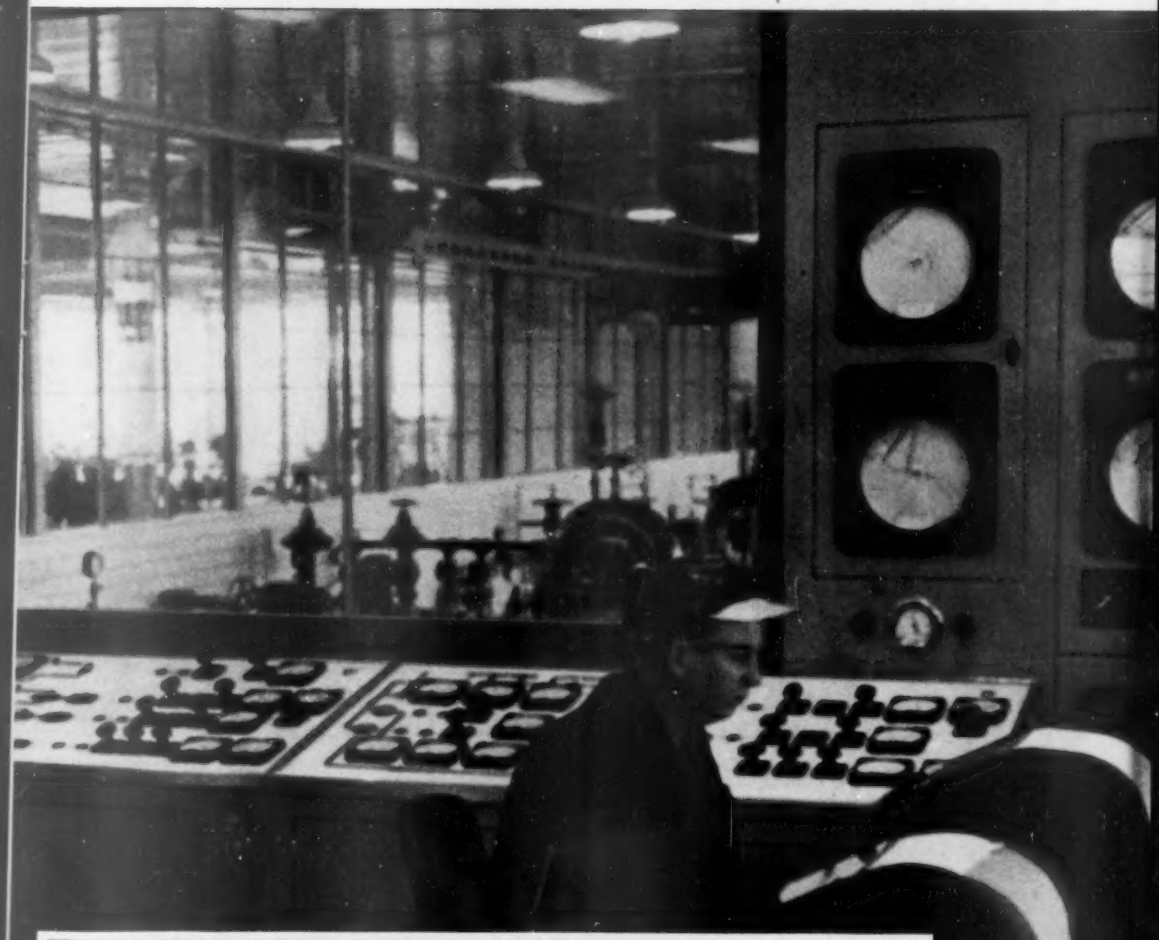
This is a good example of the kind of thinking we can apply to *all* petroleum industry projects. When your next job comes up, call in Westinghouse early. Westinghouse Electric Corporation, Box 868, Pittsburgh 30, Penna.

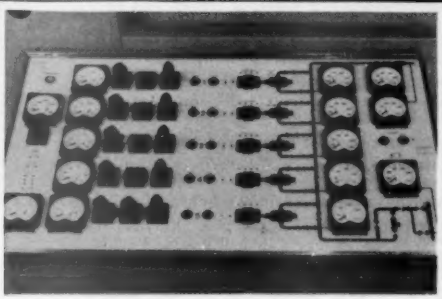
J-94907

YOU CAN BE SURE...IF IT'S Westinghouse

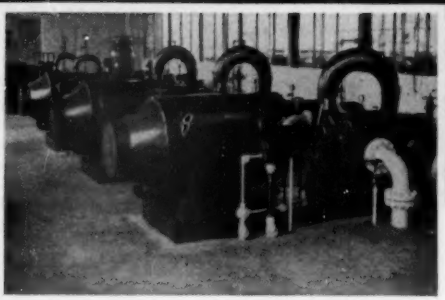
EQUIPMENT FOR THE PETROLEUM INDUSTRY

They did what you can do to produce more





Plantation's highly mechanized pumping stations are operated from these Westinghouse control panels. Electrical pressure gauges were specially developed to permit the use of the simplified flow-control board.



Big explosion-resistant Westinghouse motors drive the pumps on the Plantation Pipeline. These motors were especially designed and built for pipeline duty and they have given outstanding service.

When *Speed* Counts

You Can Count On Bucyrus-Eries

WHEN fast-moving "hands" are needed for your oil field maintenance jobs, pick the winners — Bucyrus-Erie hydraulic and cable bulldozers. They're winners because of field-proven performance features that can pay off on *your* lease, too.

Mounting Bucyrus-Erie bulldozers on International tractors does not materially change the tractor balance point — Balanced Design is the reason! Greater operating speed through even weight distribution, full tractive effort and maximum force concentrated at the blade are all benefits of *Balanced Design*. Tractor operating characteristics remain the same after adding the bulldozer attachment. Blade loads have no effect on free track oscillation — full ground contact permits transmitting full tractive effort to the blade.

Scientifically curved blades roll the dirt and keep it "alive". Load resistance is substantially reduced to get the job done in a hurry.

For the detailed and complete story on these hard-hitting machines call on your International Industrial Tractor distributor — he'll show you the *fast* way to handle oil field maintenance!

300T51

BUCYRUS ERIE

SOUTH MILWAUKEE
WISCONSIN

See Your INTERNATIONAL Industrial Tractor Distributor

INGERSOLL-RAND PUMPS USED IN NATURAL GASOLINE RECOVERY

Magnolia Petroleum Company's Hickok Plant, located near Ulysses, Kansas, is currently processing 120 million cubic feet of natural gas daily. From this gas, 100% of the natural gasoline, 50% of the butane and 17% of the propane are recovered by the absorption process. Residue gas is sold to a pipeline. Oil circulation rate is automatically controlled to maintain minimum heating value of 950 BTU. A well pressure of 300 psi makes plant compression unnecessary at the present time.

All centrifugal pumps used in the plant were supplied by Ingersoll-Rand. The Class BSFL Process pumps in the left foreground of the illustration above handle gasoline at 95°F. Other units handle lean and rich oils and the distilled LPG's butane and propane.

Ingersoll-Rand builds a complete line of dependable pumping equipment for the petroleum and refining industries. For real, long-range economy, call in Ingersoll-Rand on your next pumping problem and take advantage of their many years of practical, field experience.

Three, 8-cylinder I-R Class PVG gas engines provide power for the Hickok Plant. Developing 370 hp, these 4-cycle, V-design units drive 300 kw generators. Two I-R Motorpumps handle the cooling water for the engines.

Ingersoll-Rand

Cameron Pump Division, 11 Broadway, New York 4, N. Y.

709-10

COMPRESSORS AIR AND ELECTRIC TOOLS GAS ENGINES PUMPS TURBO-BLOWERS VACUUM EQUIPMENT

AXELSON SUCKER RODS . . . are heat

treated the ***full length*** to insure uniform grain structure from end to end and to remove forging strains and heat demarcations. Full length normalization gives Axelson sucker rods the best combination of strength, ductility and shock resistance.

OUR 65th YEAR

AXELSON *Known first . . . to last!*

PETROLEUM PUMPING EQUIPMENT

THERE IS NO ECONOMICAL SUBSTITUTE FOR QUALITY

AXELSON MANUFACTURING CO. • PLANTS—Los Angeles 58, Calif.; St. Louis 16, Missouri. OFFICES—New York City 7, New York; Tulsa 1, Oklahoma; Buenos Aires, Argentina. DISTRIBUTORS — Jones & Laughlin Supply Co.; Great Northern Tool & Supply Co.; Industrial Agencies, Ltd., San Fernando, Trinidad, B. W. I.; Industrias Waldrip & Campbell, Barcelona, Caracas and Maracaibo, Venezuela; South American Supply Co., Ltd., Lima, Peru; Sociedad Comercial de Materias Primas Limitado, Rio de Janeiro, Brazil; G. Saavedra e Hijos, S. de R. L. Avenida Morelos 31, Mexico, D. F.; Dominion Oil Field Supply Co., Ltd., Calgary, Canada.

IT'S PACKED WITH SATISFACTION WHEN IT'S PACKED WITH R/M

You will find Raybestos-Manhattan packings and gaskets in machines like this reciprocating boiler-feed pump, and in practically every other type of fluid-handling equipment in industry. The long line of R/M packings and gaskets is relied on by experienced engineers, not only for pumps, but for valves, compressors, expansion joints, hydraulic rams, and wherever trouble-free service is essential. The R/M distributor near you will gladly help you select the right packing or gasket for your needs. Or write for the R/M Packing Catalog.

R/M PACKINGS

RAYBESTOS-MANHATTAN, INC.

PACKING DIVISION, MANHEIM, PA.

FACTORIES: Bridgeport, Conn.; Manheim, Pa.; No. Charleston, S.C.; Crawfordsville, Ind.; Passaic, N.J.; Peterborough, Ontario, Canada

RAYBESTOS-MANHATTAN, INC., Manufacturers of Packings • Asbestos Textiles • Mechanical Rubber Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings • Brake Blocks • Clutch Facings • Fan Belts • Radiator Hose • Sintered Metal Products • Bowling Balls

Keep Heat Transfer Surfaces CLEAN...

SPECIFY

Vogt

SCRAPED SURFACE *Exchangers*

IF you are all "gummed up" with a tough heat transfer problem, Vogt Scraped Surface Exchangers will provide the answer. They have patented scraper elements which prevent fouling of the heat transfer surfaces and insure the highest rate of heat exchange between the product and the cooling or heating medium. The scrapers also continuously agitate the fluid and assist removal of solids from the unit.

DOUBLE PIPE EQUIPMENT is available in two types; EXCHANGERS, for cooling with water, brine, and cold filtrate, and for heating with steam or hot liquids; and CHILLERS, for use with volatile refrigerants such as ammonia, propane, and Freon. Both types have 8" jacket pipes and 6" inner pipes with scrapers.

SHELL AND PIPE TYPE UNITS are designed for use with volatile refrigerants and for heating fluids with steam or similar heating mediums. They consist of large welded shells each containing seven 6" scraped pipe sections.

Vogt Scraped Surface Exchangers serve profitably as oil chillers, crystallizers, and heaters in many processes in the petroleum and chemical industries. Their application to your heat transfer problems will receive the prompt attention of our Engineering staff.

Write for Bulletin PE-1

*DOUBLE PIPE UNIT. Drive end close-up of 12 section unit under test in our shop.

*SHELL and PIPE UNITS. Two of five units installed in a leading petroleum refinery.

*Patented

HENRY VOGT MACHINE CO.

LOUISVILLE 10, KENTUCKY

Branch Offices:

NEW YORK • PHILADELPHIA • CLEVELAND • CHICAGO

ST. LOUIS • DALLAS • CHARLESTON, W. VA.

a few words about alloy steels

or...THE ALTERNATE ALLOY that never interrupted production

This could happen to you! A customer of ours was forced by restrictions and alloy shortages to switch from the Republic alloy steel he'd been using for years to one of the alternate alloys that he could get. He'd dreaded the problems of redesigning tools and dies, of revising heat-treating procedures, of heavy reject rates while the switch was being made.

But these troubles never came!

He called upon the Republic 3-Dimension Metallurgical Service . . . the Republic Field Metallurgist, backed up by the Republic Mill and Laboratory Metallurgists. These three men worked with the customer's metallurgist and his production foreman. Together, they analyzed his requirements, recommended the best available alternate steel, worked out the way to form the steel and heat-treat it.

The shift was made with almost no interruption, and never a headache.

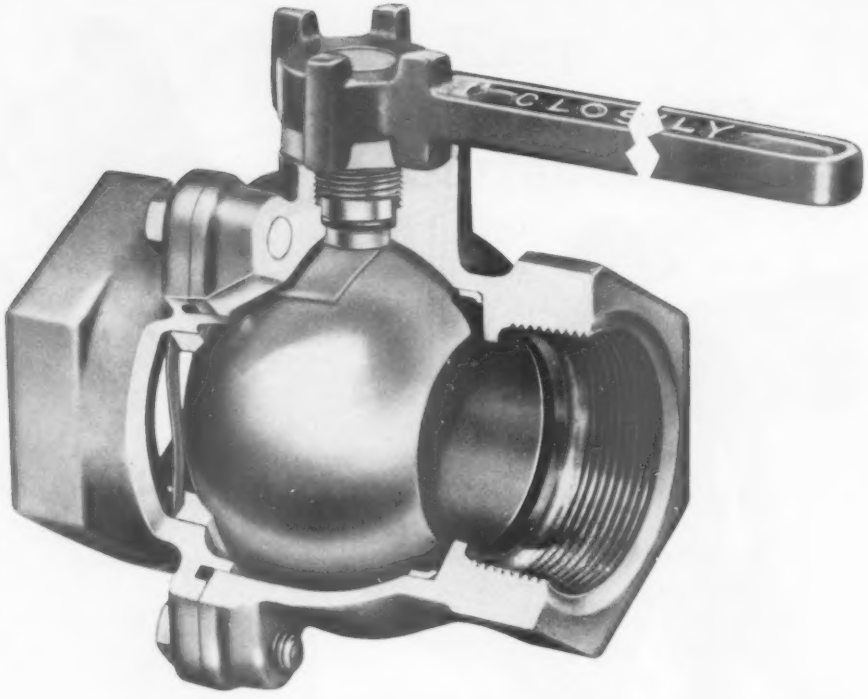
We may be able to do the same job for you . . . and to back up our recommendation with one of the many fine alloys produced by Republic . . . world's largest producer of alloy and stainless steels.

REPUBLIC STEEL CORPORATION
Alloy Steel Division • Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

LAB MILL FIELD
3-DIMENSION Metallurgical Service

REPUBLIC STEEL
Republic ALLOY STEELS

Other Republic Products include Carbon and Stainless Steels—Sheets, Strip, Plates, Pipe, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing



NEW BALL VALVE

gives you more of what you want in a valve

Full round flow . . . as full as if there were no valve in the pipe at all. Handles fluids with minimum friction loss . . . without turbulence.

Quick opening . . . Quick closing . . . even under full pressure. Needs only an easy quarter turn.

Resists wear longer . . . chrome-plated floating bronze ball is extremely resistant to scratching, pitting, abrasion.

Stays leakproof . . . When valve is in closed position, pressure of fluid automatically positions ball against synthetic rubber seat to form a tight seal.

DISTRIBUTORS IN ALL PRINCIPAL CITIES

APPROVED BY UNDERWRITERS' LABORATORIES, INC.

Among the many satisfied users of Rockwood Ball Valves are:

Libbey-Owens-Ford Glass Company
Revere Copper & Brass Incorporated
Bird Machine Company
Remington Rand, Inc.
Hub Machine Company
Daggett Chocolate Co.
G. F. Heublein & Bro., Inc.

Send For Free Bulletin, "New Rockwood Ball Type Valves," containing detailed information.

ROCKWOOD

ROCKWOOD BALL VALVES

ROCKWOOD SPRINKLER COMPANY

104 Harlow Street, Worcester 5, Mass.

FOR LUBRICATING OR HIGHLY VISCOUS LIQUIDS you can't beat the double-helical gear rotary pump. Over thirty years' experience in a wide variety of services has proven this.

Worthington's double-helical or "herringbone" gear rotaries are specially designed to handle extremely viscous or lubricating liquids. Each unit operates smoothly and quietly whether its capacity is 1 or 5,000 gpm. All sizes have a maximum pressure rating of 500 psi.

Other advantages of these gear type rotary pumps are: their ability to handle a considerable amount of air or gas in the liquid, and their use with steam jackets for pumping liquids that become solid in normal temperatures. Types GA for general service, GR for heavy-duty service. Type GRJ is steam jacketed. All units can be arranged for motor, turbine, engine, or belt drive with conventional stuffing box or mechanical seal.

Here's your widest choice in rotary pumps —both gear and vane types

FOR NON-LUBRICATING, SLIGHTLY ABRASIVE OR CORROSIVE LIQUIDS, Worthington has built its heavy-duty sliding-vane type pumps. Here, the pressure of the liquid maintains contact of the vanes against the liner so that wear is automatically compensated for. All pumps are fitted with removable liners. End plates and vanes can be reversed if necessary.

External bearing models will handle non-lubricating, slightly abrasive or corrosive liquids without bearing failure, even though heads are relatively high.

External or internal bearings, capacities from 25 to 1,000 gpm, all with maximum pressure ratings of 200 psi. Type VE has external bearings, Type VR has internal bearings. Both available with or without relief valves.

Whether you pump lubricating or non-lubricating liquids, highly viscous or highly volatile, small or large capacities—check the *complete* Worthington rotary-pump line before you buy. For further information write for Bulletin W-487-B10B on Heavy-Duty Gear Pumps or Bulletin W-485-B1 on Vane Type Pumps. Worthington Corporation, formerly Worthington Pump and Machinery Corporation, Reciprocating Pump Division, Harrison, N. J.

P.2.1

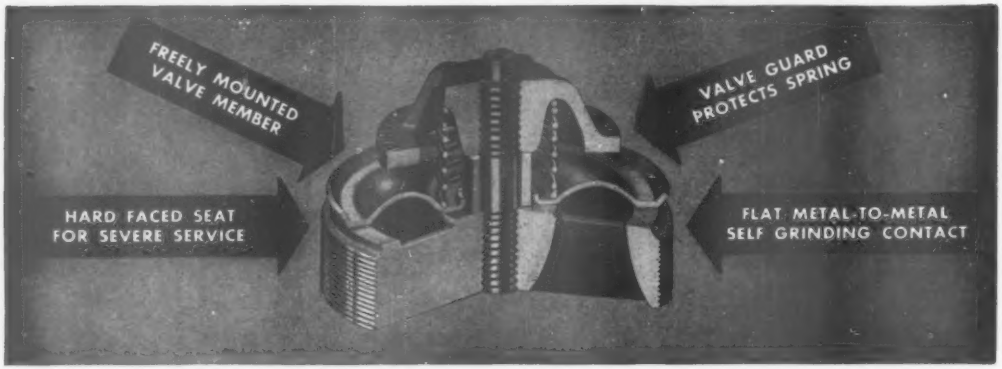
The World's Broadest Line Assures You the Right Pump for Every Job

WORTHINGTON

Rotary Pumps

DURABLA

METAL PUMP VALVE UNITS
KEEP YOUR PUMPS IN SERVICE


FREELY MOUNTED VALVE MEMBER
VALVE GUARD PROTECTS SPRING
HARD FACED SEAT FOR SEVERE SERVICE
FLAT METAL-TO-METAL SELF GRINDING CONTACT

1 **THEY ARE SELF-GRINDING:** Durabla Valve Units*, utilizing the freely mounted arched construction valve member exclusive to Durabla, are self-grinding, as the flat portion of the valve member is in direct contact with the flat valve seat and is free to move about its axis, thus producing a constant self-grinding action.

2 **VALVE SEATS ARE HARD FACED FOR SEVERE SERVICE:** Providing a seat surface hardness of Rockwell C-48-52 (approximately 500 Brinnel) or more in special valves, Durabla Valve Units have a long record of effective service with FLUIDS CARRYING SUSPENDED ABRASIVE SUBSTANCES. The metal valve member effectively prevents the pitting or "pick-up" of abrasive substances sometimes occurring with valves made of other materials.

3 **VALVE SPRINGS AND VALVE STEMS ARE PROTECTED:** The Valve Guard protects the Valve Spring from ever compressing more than 50% of its length. The Valve Stem is protected against breakage by the free mounting of the Valve Member.

Economy, efficiency and adaptability, based on long established service records and exclusive design make Durabla Valves your guarantee of reliable, uninterrupted pump operation.

You can specify Durabla Valves when you order a pump, (many manufacturers use them as standard equipment), or you can order Durabla Valves to fit any type of reciprocating pump, (they come with drive-fit seats or threaded seats with or without a shoulder to suit the job).

TO AVOID "PUMP TROUBLES" SPECIFY DURABLA VALVES

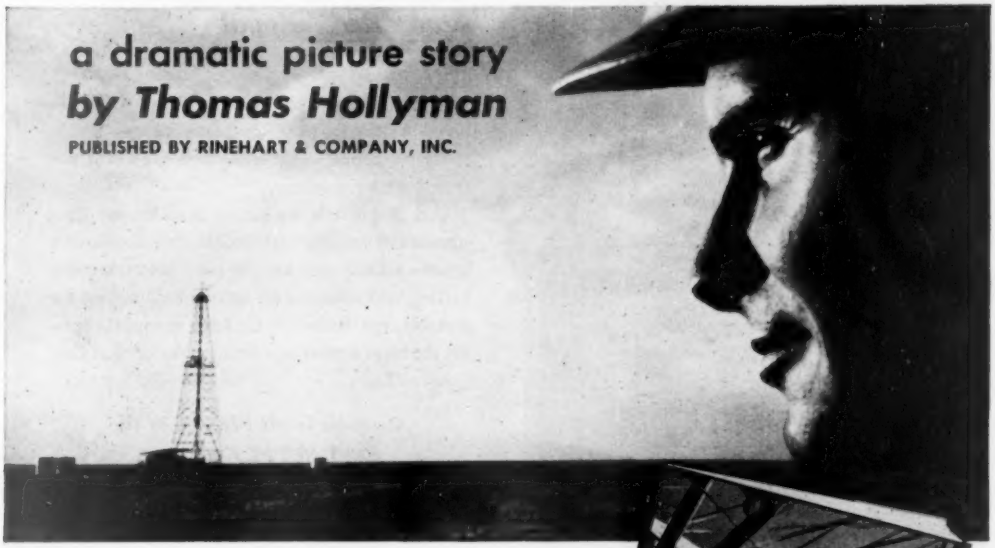
Address DURABLA Engineering Department for information and bulletin: Reference JG-6

*Patent Numbers 2090486, 2117504

DURABLA MANUFACTURING COMPANY
114 LIBERTY ST. NEW YORK
BRANCHES IN PRINCIPAL CITIES. FOR CANADA REFER: CANADIAN DURABLA LIMITED, TORONTO

It's your industry . . . It's your story . . . It's the book for you . . .

"The Oilmen"



a dramatic picture story *by Thomas Hollyman*

PUBLISHED BY RINEHART & COMPANY, INC.

It's a book you'll use hundreds of times —the picture story that captures the personality of an industry

● Consulting photographic editor of *Holiday*, and a contributor to other top magazines, Tom Hollyman now turns his lens on *oil*—to tell its exciting story in terms of the industry's men and women.

Dramatically photographed, concisely written, clothbound and oversize, "The Oilmen" tells petroleum's full story from search to discovery...through production, refining, transportation, marketing... to the ultimate user's door. It's a book the industry has needed for years, a book that every man and woman associated with petroleum must see, read, own.

$1.50 ACTUAL SIZE 10½" x 10¼"

Shell Oil Company and its employees co-operated with Mr. Hollyman to make this picture story possible—and offer this announcement as a service to the men and women who have made oil the nation's No. 1 source of energy.

"The Oilmen," published by Rinehart & Company, Inc.
First Edition available May 1, 1952

AT ALL LEADING BOOK STORES—OR SEND COUPON

Rinehart & Company, Inc., Dept. 25
232 Madison Avenue, New York 16, New York

Please send me.....copies of THE OILMEN @ $1.50.
I enclose check or money order in the amount of $.....

Name.....

Address.....

"Anywhere in the 'Oil Patch' we stick to U. S. Royal 4,"

says "Red" Royal

He has his good reasons. He knows that U. S. Royal 4 Rotary Hose eliminates delays, avoids costly down time. That's why you can't beat this great hose for economy.

U. S. Royal 4 is the perfect hose for any rig—standard or portable—it's flexible. Two double wire layers—*actually two hose in one*—resist excessive kinking and straining on narrow base rigs of the portable type. It also has the burst strength to combat the highest pressures found in the deepest Gulf Coast wells.

Available in all FIELDS at the BEST SUPPLY STORES

Use U. S. Royal 4 all the way... use it from spud to pay *in any field at any drilling pressure.*

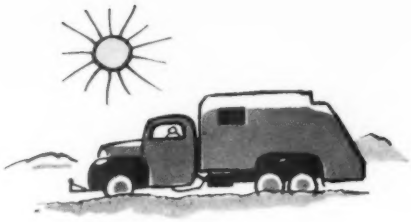
PRODUCT OF

U.S.RUBBER

Developed by Science... Proved by Drillers

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION · ROCKEFELLER CENTER, NEW YORK 20, N. Y.



ANYWHERE....

ANY TIME.....

ANY WAY.....

NIGHT AND DAY – 24 HOURS
ROUND THE CLOCK.....

WHY OPERATORS PREFER
SCHLUMBERGER!

Topic

PARKERSBURG HYDROMATIC

. . . the finest, most efficient drawworks brake ever built.

And here's new evidence, by the industry itself, to support this fact. Hydromatic brake sales for 1951 were the highest in the history of the Company. That means more and more operators are turning to the Parkersburg Hydromatic for the dependability, safety and economy they need in a drawworks brake. It means, too, Hydromatic Brakes, through continuous development, are giving them more and more performance and operating advantages.

Here are a few of the recent developments that are keeping Parkersburg Hydromatic Brakes the finest ever built:

46" SUPER HYDROMATIC.

Delivers 30% more braking power than our 40" double rotor hydromatic. Has the power needed to meet the braking problems of 90% of today's deep drilling operations.

OVER-RUNNING CLUTCH.

Parkersburg's recently developed over-running clutch positively and automatically engages the brake as soon as the load starts to descend. Smoother engagement eliminates shock load on brake and rig. Decreases time required for round trips about 10%. Not a single mechanical failure reported during 2 years of testing in the field. Available from Parkersburg or can be installed by your drawworks manufacturer on your new rig. Adopted as optional equipment by two leading drawworks manufacturers.

SIZES FOR EVERY RIG . . . EVERY DEPTH.

Available in 11 sizes, 15" through 60", you can get exactly the size of Hydromatic Brake you need for drilling to any depth up to 20,000 feet and more.

Write for newest Hydromatic Brake Catalog, HB-1-52. It contains complete information on the use and selection of Hydromatic Brakes, capacity charts for all sizes and other pertinent data about their installation and operation.

5203

PARKERSBURG

RIG & REEL COMPANY • Parkersburg, West Virginia

They Say—

No Risk for Some

"When the terrific capital investment of the oil producer is taken into account, with all of the consequent hazards and risks of no return, it can fairly be said that the ordinary owner of surface and minerals is in most instances more than justly compensated for the return derived from his mere execution of an oil and gas lease.

"There are many thousands of people who without capital risk, effort or initiative on their part have derived income from royalties upon execution of a lease far and beyond greater than sufficient to provide their entire livelihood."

Philip J. Close, Commerce Trust Co., speaking at the University of Kansas City.

Supreme Court on Depletion

"I believe that we can safely state that the oil industry has been exceedingly fortunate in the quality of the Supreme Court decisions on depletion. The court's grasp of the realities of the oil business is well illustrated by its reasoning and conclusions in such cases as Lynch vs. Alworth-Stephens Co., Palmer vs. Bender, and Thomas vs. Perkins."

Hilary D. Mahin, Phillips Petroleum Co., speaking in Kansas City.

Nationalization Means Less Oil

"The few countries that have nationalized their oil industries have shown rather strikingly how not to find and produce oil.

Russia's original store of oil was probably comparable to that of the United States. In 1900 and 1901 she was the world's leading oil country, producing more than the United States. Since then her annual production has multiplied by three, that of the United States by nearly 30. In 1901 she produced more than 50 per cent of the world's oil; in 1951 she produced 6½ per cent.

"In 1921 Mexico was in second place among the world's producers. She produced nearly 23 per cent of the world's oil and 41 per cent as much as the United States. In 1951 she produced less than 2 per cent of the world's supply and less than 4 per cent as much as the United States.

"Argentina's progressive nationalization has failed to produce enough oil

Why Good Pipe Fitters Choose

RIDGID

4P Geared Pipe Threader

No. 4P, 2½" to 4" pipe

Extra easy to carry and put on pipe

★ Balanced loop handles—easy to swing 4P where you want it.

★ Mistake-proof workholder sets to size *before* put on pipe—only one set screw.

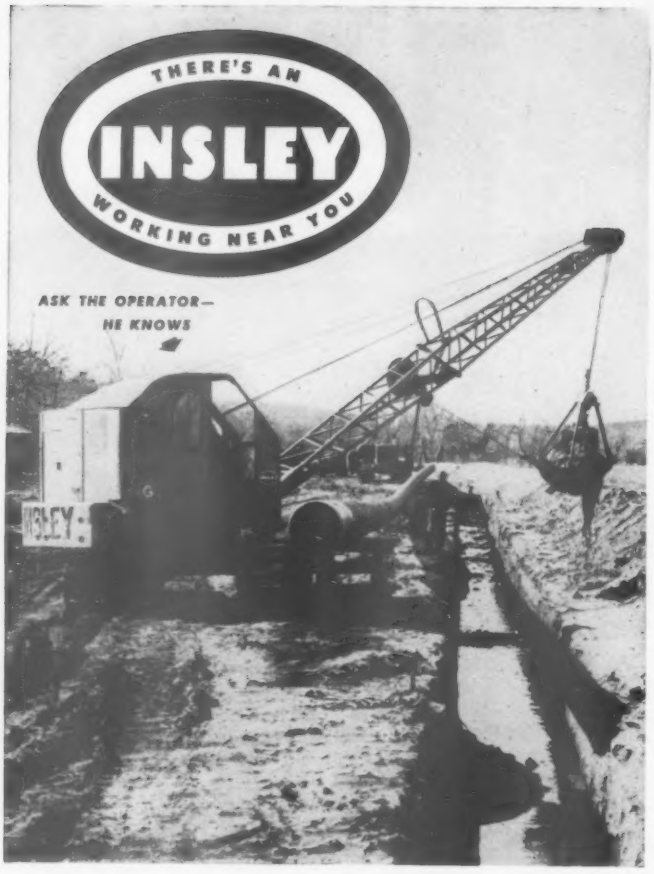
★ Practically no upkeep—drive pinion in oilless bronze bearing; safe enclosed gear.

★ 4 sets of 5 high-speed steel dies for 2½", 3", 3½", 4" pipe. Ratchet handle; RIDGID Universal Drive Shaft available. Also special 4P for conduit.

★ Buy efficient 4P at your Supply House.

THE RIDGE TOOL COMPANY • ELYRIA, OHIO

★★★ RIDGID Work-Saver Pipe Tools ★★★



The INSLEY operator knows..

PROJECT RATED
INSLEY
BY THE USER—FOR THE USER

that Insley Equipment can be rated-for-the-project . . . he knows that specification alternates make it possible to buy the exact equipment to do his job best.

INSLEY MANUFACTURING CORPORATION • INDIANAPOLIS 6, INDIANA

for her needs. Iran, the latest country to nationalize, has got nowhere fast.

"These countries, be it noted, took over strong established industries—going concerns—built by foreign know-how and foreign capital. Even with such a start they failed to keep pace. As for the countries that have nationalized before they had oil industries, they still have no oil industries worth mentioning."

Max W. Ball, consultant, addressing the Commonwealth Club of California, San Francisco.

The Why of Avgas Demand

"To the uninformed, it has been a mystery why there should be any substantial military demand for aviation gasoline in view of the advancement that has been made in adapting jet aircraft to military missions.

"For operation today, and indeed during the first few years of an all-out war starting in the near future, turbo-jets would be used predominantly in fighter aircraft. Transport planes and bombers in most extensive operational use still employ reciprocating engines. All carrier-based jets use high octane number gasoline because of mixed squadrons of turbo-jet and reciprocating engine craft aboard and the complexity of handling two aviation fuels aboard carriers.

"Nevertheless, for any war in the future, turbo-jet aircraft will ultimately outweigh by a considerable number those using reciprocating engines."

Thomas L. Apjohn, Socony-Vacuum Oil Co., Inc., addressing the Aero Club of New England, Boston.

Strike Effects Remain

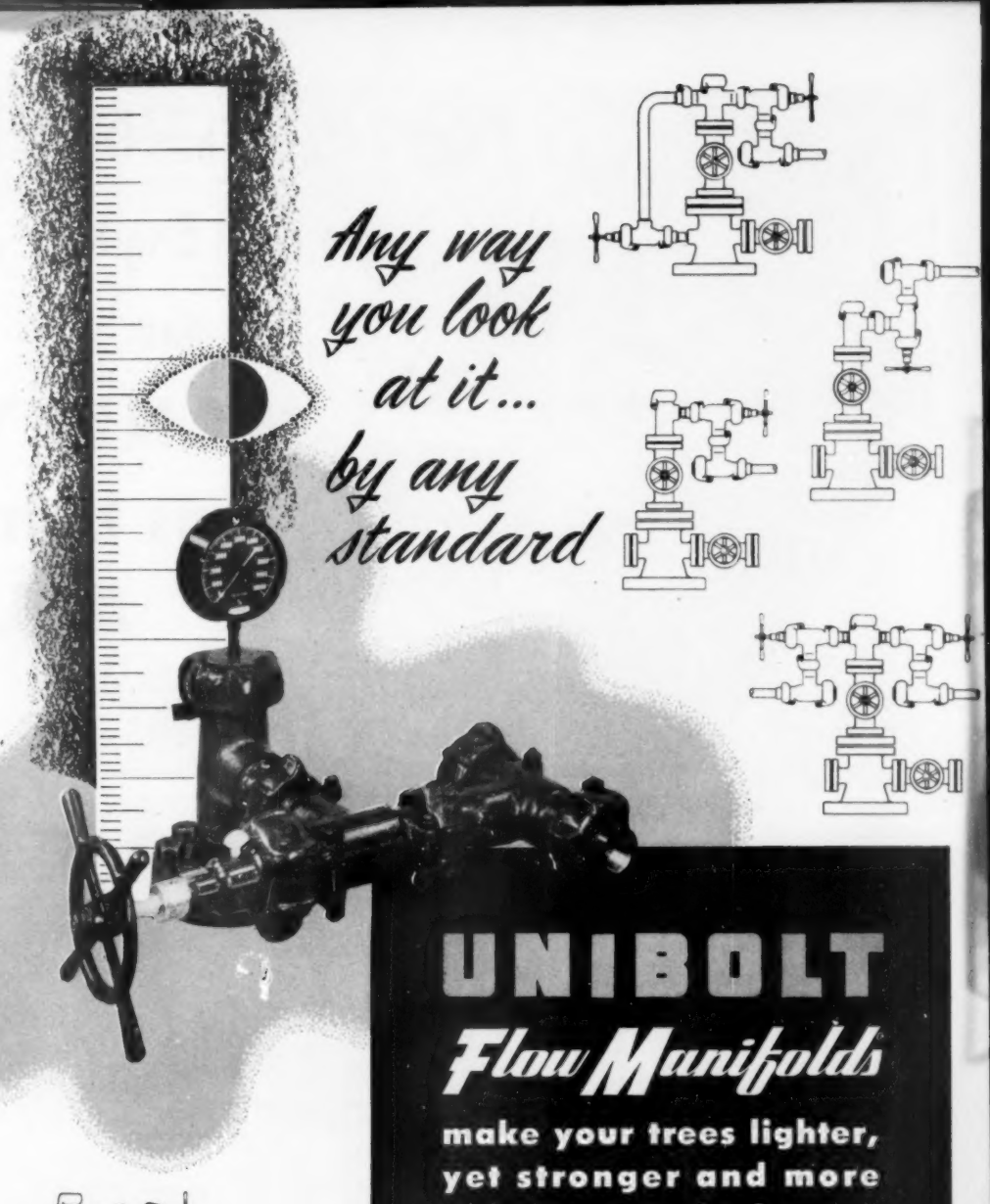
". . . The country has suddenly gone from an excess to around 10 million barrels of products to a deficiency of around 40 million barrels of products, nearly half of which deficiency is in gasoline.

"If we were in a free economy with free prices, it would be much easier to take care of such dislocations.

"The present situation of product prices being frozen at levels prevailing on one particular date has largely destroyed the automatic regulatory effect of price on supply and demand, both as between different areas and between different products.

"Somewhat higher prices would bring into operation refineries or refinery units which cannot operate profitably under existing ceiling prices."

Dr. Robert E. Wilson, chairman of the board, Standard Oil Co. (Ind.), addressing the purchasing and stores division of the Association of American Railroads, Chicago.



Any way you look at it... by any standard

UNIBOLT

Flow Manifolds

make your trees lighter, yet stronger and more economical

Ask your Christmas tree supplier to furnish UNIBOLT Flow Manifolds (everything above the master valve). These compact, completely salvageable manifolds, consisting of a Tee or Cross, Adjustable Wing Valve, and Positive Choke Body, are pressure-tested as a unit and may be assembled in a number of combinations to best meet individual needs.

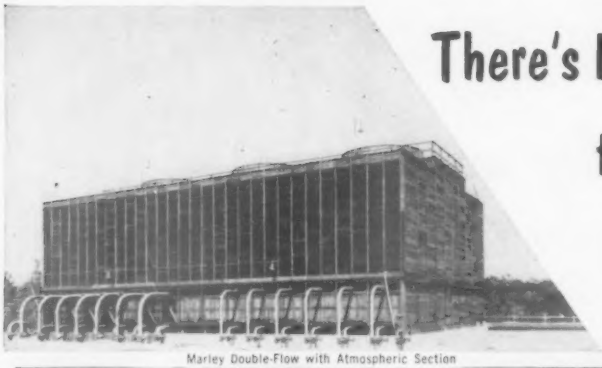
Employing standard UNIBOLT connections rather than flanges, the UNIBOLT Flow Manifold is many pounds lighter, yet the UNIBOLT design, which places more metal in shear, actually results in a higher factor of safety for the manifold.

Furnished in regular forged steel or in high-chrome alloy for corrosive wells — 6000, 10,000 and 15,000 lbs. test.

THORNHILL-CRAVER COMPANY

P. O. BOX 1184 HOUSTON, TEXAS

There's More Than One Way to Cool Engines . . . and MARLEY has them ALL!



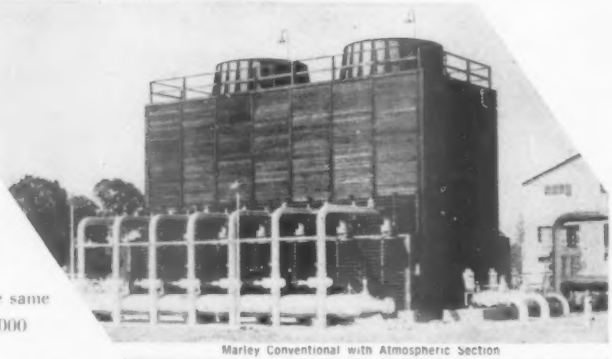
Marley Double-Flow with Atmospheric Section

Marley Forced Draft DriCooler

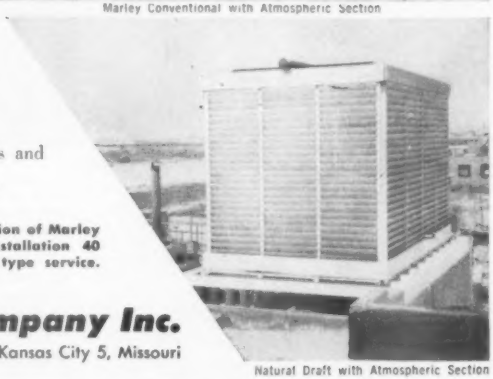
Whatever method of cooling your plant requires, whether cooling medium be air or water, you'll find the finest equipment in the complete Marley line.

Marley Dri-Coolers are increasingly popular as more and more plants utilize air cooled heat exchange. The flexibility of header design and finned tube arrangement makes Dri-Coolers ideal for cooling of jacket water and lube oil and other high level cooling, either singly or both in the same unit. They now serve plants from 50 hp to 23,000 hp, in many countries and climates.

For water cooling, Marley has long set the standard. Marley patented Double-Flow, Conventional induced draft and atmospheric towers are all adaptable for indirect cooling through standard Marley atmospheric sections. Marley towers and sections are completely integrated units and the range of sizes fits every requirement of any size plant.



Marley Conventional with Atmospheric Section



Natural Draft with Atmospheric Section

PRECOOLING AIR is another function of Marley cooling towers. In a single installation 40 Marley Aquatowers are in this type service.

MARLEY

The Marley Company Inc.

Kansas City 5, Missouri

CALENDAR

JUNE

19-20 Kentucky Oil and Gas Association, annual meeting, Hotel Lafayette and Phoenix Hotel, Lexington, Ky.

22-25 Petroleum Equipment Suppliers Association, Mark Hopkins Hotel, San Francisco.

23-24 Michigan Gas Association, annual meeting, Grand Hotel, Mackinac Island, Mich.

23-27 American Society for Testing Materials, annual meeting, Hotel Statler, New York.

23-27 American Institute of Electrical Engineers, summer general meeting, Nicollet Hotel, Minneapolis.

23-27 American Society of Mechanical Engineers, Oil and Gas Power division, annual conference and exhibit, Hotel Statler, Buffalo, N. Y.

JULY

21-25 National Conference on Clays and Clay Technology, University of California, Berkeley.

AUG.

1- 3 Wyoming Geological Association, field trip, Big Horn basin.

11-13 Society of Automotive Engineers, national West Coast meeting, Fairmont Hotel, San Francisco.

19-22 American Institute of Electrical Engineers, Pacific general meeting, Westward Ho Hotel, Phoenix, Ariz.

25-27 Twelfth Annual Appalachian Gas Measurement Short Course, West Virginia University, Morgantown, W. Va.

SEPT.

1- 3 Interstate Oil Compact Commission, fall meeting, Banff, Canada.

3- 5 Pacific Coast Gas Association, Ambassador Hotel, Los Angeles.

4- 5 Rocky Mountain Oil & Gas Association, refining committee, Newhouse Hotel, Salt Lake City.

8-12 Instrument Society of America, seventh national instrument conference and exhibit, Cleveland.

10-12 National Petroleum Association, fiftieth annual meeting, Hotel Traymore, Atlantic City, N. J.

11-13 American Institute of Chemical Engineers, regional meeting, Palmer House, Chicago.

25-26 Western Petroleum Refiners Association, regional meeting, Hotel Henning, Casper, Wyo.

28-30 American Association of Oilwell Drilling Contractors, annual meeting, Skirvin Hotel, Oklahoma City.

OCT.

1- 3 American Institue of Mining and Metallurgical Engineers, Mid-Continent fall meeting, Rice Hotel, Houston.

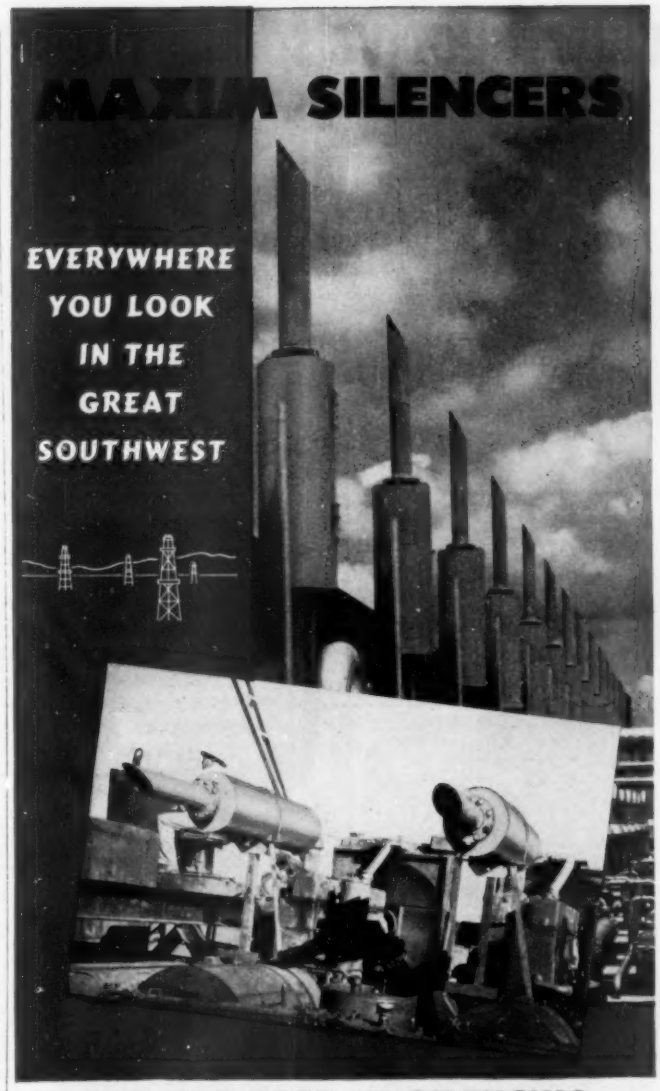
1- 3 National Association of Corrosion Engineers, South Central Region, technical program and committee meetings, Jung Hotel, New Orleans.

1- 3 American Institute of Mining and Metallurgical Engineers, Mid-Continent fall meeting, petroleum branch, Rice Hotel, Houston.

2- 3 Petroleum Electric Power Association, twenty-third annual meeting, Mayo Hotel, Tulsa.

4 John Zink Process Heating seminar, John Zink Co. plant, Tulsa.

6 Independent Natural Gas Association of America, annual meeting, Fontenelle Hotel, Omaha, Neb.



FOR THE BEST IN SILENCING

Consult MAXIM

THE MAXIM SILENCER COMPANY
Dept. W.L., 98 Homestead Ave., Hartford 1, Conn.

Gentlemen: Please send me your bulletin on
☐ Exhaust Silencers ☐ Spark Arrestors

Name _____

Company _____

Address _____

_____

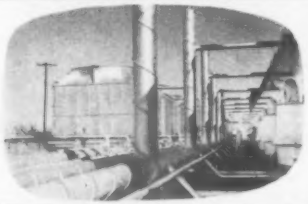
9MX52

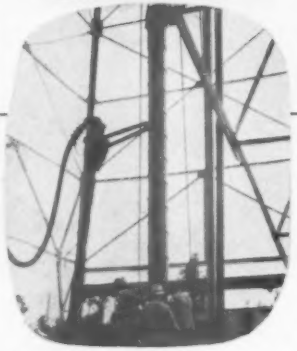
CONSTRUCTIVE SUGGESTIONS

Typical Ways in Which NAYLOR Light-weight PIPE Serves the Oil Industry

OIL FIELD APPLICATIONS

De-watering lines * Gas and oil lines * Gas and oil gathering lines * Salt water disposal lines * Sludge lines * Surface casing *(threaded)* * Vacuum lines * Syphon pipe * Tank gauge pipe * Tank swing pipe





Write for Bulletin No. 507 on line pipe and Bulletin 251 on surface casing.

Naylor Pipe Company
1232 E. 92nd St., Chicago 19, Ill.
New York Office:
350 Madison Ave., New York 17, N.Y.

Mid-Continent Supply Company, **Ft. Worth, Texas and Branches**
Exclusive distributors in Mid-Continent and Gulf Coast Areas

9-10	California Natural Gasoline Association, twenty-seventh annual fall meeting, Ambassador Hotel, Los Angeles.
13-15	Texas Mid-Continent Oil and Gas Association, thirty-third annual meeting, Hotel Texas, Fort Worth.
13-17	American Institute of Electrical Engineers, fall meeting, New Orleans.
16-19	Permian Basin Oil Show, Odessa, Tex.
19	Natural Gasoline Association of America, southern regional meeting, Blackstone Hotel, Tyler, Tex.
20-21	Independent Petroleum Association of America, annual meeting, Mayo Hotel, Tulsa.
22-24	Society of Automotive Engineers, national transportation meeting, Hotel William Penn, Pittsburgh, Pa.
22-24	American Institute of Mining and Metallurgical Engineers, West Coast fall meeting, petroleum branch, Statler Hotel, Los Angeles.
23-24	American Institute of Mining and Metallurgical Engineers, West Coast fall meeting, Statler Hotel, Los Angeles.
24-25	Independent Petroleum Association of America, annual membership meeting, Skirvin Hotel, Oklahoma City.
27-31	American Gas Association, annual convention, Atlantic City, N. J.
30-Nov. 1	Rocky Mountain Oil and Gas Association, annual meeting, Cosmopolitan Hotel, Denver.

NOV.

3- 4	Society of Automotive Engineers, national diesel engine meeting, Chase Hotel, (tentative), St. Louis, Mo.
6- 7	Society of Automotive Engineers, national fuels and lubricants meeting, Mayo Hotel, Tulsa.
6- 8	Gulf Coast Association of Geological Societies, annual fall meeting, Hotel Driscoll, Corpus Christi, Tex.
8-13	Oil Industry Information Committee, Conrad Hilton Hotel, Chicago.
10-13	American Petroleum Institute, thirty-second annual meeting, Conrad Hilton Hotel and Palmer House, Chicago.
13-14	Society of Exploration Geophysicists, midwestern meeting, Texas Hotel, Fort Worth.
20-22	Instrument Maintenance Short Course, jointly sponsored by Southern California Meter Association and Los Angeles Harbor Junior College.
30-Dec. 5	American Society of Mechanical Engineers, Statler Hotel, New York City.

DEC.

5- 6	Interstate Oil Compact Commission, winter meeting, Wichita, Kans.
7	Natural Gasoline Association of America, Panhandle-Plains regional meeting, Herring Hotel, Amarillo, Tex.
7-10	American Institute of Chemical Engineers, annual meeting, Hotel Cleveland (Hqs.) and Carter Hotel, Cleveland.

NOMADS

Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Dallas-Fort Worth Nomads, first Monday of each month, Greater Dallas Club.

Houston Nomads, second Monday of each month, Ye Ole College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month, Jonathan Club.

Today's higher costs . . . manpower shortages . . . squeezed margins of profit and increased demands for exploration and production make the services of Jack Ammann Photogrammetric Engineers more valuable to oil exploration than ever before.

Jack Ammann services can save you weeks and even months compared with more conventional methods.

Here are some of the ways Jack Ammann Photogrammetric Engineers are cutting costs and speeding work for the oil industry:

FOR PRELIMINARY GEOLOGICAL STUDY. No country is too rugged . . . no terrain too difficult for us to photograph. Detailed photographs permit immediate study of surface geology and the developing of exploration plans.

FOR EARMARKING AREAS FOR FUTURE DETAILED EXPLORATION AND DEVELOPMENT with up-to-date photos, regional maps and accompanying data.

FOR LEGAL, LEASE AND DEVELOPMENT PLANNING OPERATIONS our up-to-date regional base, fee ownership and topographic maps are a must.

FOR PIPE LINE, ACCESS ROAD, TANK AND REFINERY LOCATION aerial photographs, topographic and other types of maps are saving time, work and money for many companies.

There's no substitute for experience. In 21 years Jack Ammann Engineers have received over 10,000 orders for air photography and mosaics, regional, planimetric, ownership and topographic maps. The use of photogrammetric maps we conservatively estimate has saved our customers at least 100 million dollars.
We are prepared to meet your needs anywhere. Tell us your problem. Without obligation, we'll show you how we can be of profitable help.

READY NOW

We have available for immediate delivery over ¼ million miles of new photographic coverage, regional and ownership maps of western states. Write, wire or phone for index and prices.

Dependable World-wide Mapping Service

JACK AMMANN
PHOTOGRAMMETRIC ENGINEERS

829-31 N. ST. MARY'S ST. • PHONE FANNIN 5168
SAN ANTONIO, TEXAS

★

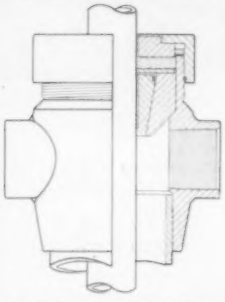
32 HILLCREST • P. O. BOX 411 • PHONE 7-1840
MANHASSET, N. Y.

HINDERLITER HW TUBING HEADS

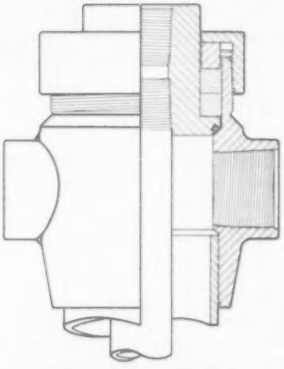
(Patented)

for 30 years the standard production heads of the industry!

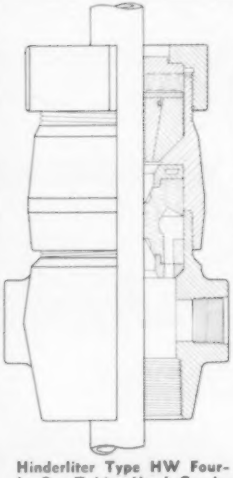
THE best known well head in the industry because — you caused it to be designed to solve your producing problems. More than thirty years of experience in the manufacture of casing and tubing heads goes into the modern Type HW Two-In-One and Four-In-One Tubing Heads. The rugged construction of the Type HW heads puts the "beef" where you need it, no thin spots around openings. Recommended for 67,200 lbs. tubing weight, it is fabricated of drop forged steel. Available with threaded or flanged bottoms.



Hinderliter Type HW Two-In-One Tubing Head complete with Slip Suspension.



Hinderliter Type HW Two-In-One Tubing Head complete with Hanger Suspension.



Hinderliter Type HW Four-In-One Tubing Head. Can be used to perform almost any production or work-over operation without removing the head from casing.

The complete line of Hinderliter Tubing and Casing Heads comprises types to fit every drilling, completion and production process.

At Your Supply Stores

H. K. PORTER COMPANY, INC.

HINDERLITER TOOL COMPANY DIVISION

DRAWER 2650 TULSA 1, OKLAHOMA

THE OIL AND GAS
JOURNAL
TULSA, OKLAHOMA

Published every Monday by The Petroleum Publishing Co., 211 S. Cheyenne, Tulsa, Oklahoma. Founded in 1902. Name changed to The Oil and Gas Journal in 1910 by Patrick C. Boyle.

•

P. C. Lauinger, President; S. H. Rourke, Executive Vice President; Mitchell Tucker, Vice President and Advertising Manager; Hanson B. Pigman, Circulation Manager; Donald W. Wilson, Manager, Industry Census Department; J. Parker Holland, Production Manager.

EDITORIAL STAFF

C. O. Willson, **Editor;** Kenneth B. Barnes, **Managing Editor;** Henry D. Ralph, **News Editor;** George H. Weber, **Refining Editor,** 500 Fifth Avenue, New York; Dahl M. Duff, **International Editor,** 500 Fifth Avenue, New York; Gerald L. Farrar, **Engineering Editor;** Paul Reed, **Pipe-Line Editor;** W. L. Nelson, **Technical Editor.**

Associate Editors: Lynn M. Nichols, Neil Williams, R. B. Tuttle, Philip C. Ingalls, and John C. Casper.

District Editors: TULSA: Ted A. Armstrong, Joseph A. Kornfeld, John C. Reidel, William P. Sterne, Robert J. Enright, and John C. McCaslin. HOUSTON, Sterling Building: Walter Rose, and F. Lawrence Resen. LOS ANGELES, 650 South Grand Avenue: D. H. Stormont. DALLAS, Mercantile Bank Building; Carl F. Hoot. WASHINGTON, D. C., 621 Albee Building: Bertram F. Linz. MIDLAND, TEX., McClintic Building: Roy F. Carlson. CHATHAM, ONT., 35 Stanley: Victor Lauriston.

Editorial Assistants: Carolyn Carter, Tulsa; Martha Allbright, Tulsa, and Lucy Dee Owen, Houston.

Correspondents at Denver, Pittsburgh, Calgary, Columbus, Ashland, Ky., Oil City, Pa., and Mount Pleasant, Mich.

Advertising Offices: TULSA: John D. Reilly, Mid-Continent Manager, 211 South Cheyenne; NEW YORK: Charles A. Wardley, Eastern Manager, and Robert N. Caird, Jr., Representative, 500 Fifth Avenue, Phone LOngacre 4-1750; CHICAGO: C. R. Farmer, Manager, and E. S. Klappenbach, Representative, 105 West Madison Street, Phone Central 6-2537; PITTSBURGH: Alfred M. Jones, Manager, 429 Fourth Avenue, Phone Atlantic 1-4835; HOUSTON: John M. Spears, Gulf Coast Manager, Sterling Building, Phone Charter 4626; LOS ANGELES: Donald O. Hanson, Manager, 650 South Grand Avenue, Phone Vandike 0732; ENGLAND: Harry Becker, European Representative, 111 Thorley Lane, Timperley, Cheshire, Phone Ringway 4702.

•

Subscription rate to the petroleum industry, United States and foreign, 1 year, $4.00. Single copies, 50 cents. Back copies when over a year old, one dollar. Note: Payments from outside the U.S.A. may be in the form of an international money order or check on a U.S.A. bank. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879. Copyright 1952 by The Petroleum Publishing Co.

Member
Audit Bureau of Circulations
Associated Business Papers

JOURNALLY Speaking

Coastal Doings

YOU start a well in Texas, drill through part of Louisiana, and end up in Texas again. Sounds screwy and it is screwy, but no screwier than a lot of other things the oil industry does to get oil and gas from places where people said it couldn't be done.

This interstate well is being drilled in Orange, Tex., and the reason for it is told in an article on Phoenix Lake field starting on page 317 of this issue. It's just one of a series of amazing articles on Gulf Coast oil which make up our annual special issue on this amazing region.

Drilling through two states is nothing compared with the problems licked in drilling way out in the ocean, getting around through swamps, making petrochemicals out of gas, and all the other feats described in this issue. The Gulf Coast has been a major factor in the world's oil industry for 50 years and yet it's just now hitting its stride. The people who say we're running out of oil are people who don't have enough imagination to do the things oil men are doing today on the Gulf Coast—and everywhere else.

And when you're reading about the Gulf Coast you'll want to make use of the big wall map that came in the same envelope with this issue. Don't let anybody snitch your copy.

What a Brain

WE sent our Green Hand out to get a line on Sunray's new electronic computing machine the other day. A great many hours later we found on our desk not a story but these notes:

"Interviewed electronic brain. Quite a gadget. Like something from Mars. Does week's work of six men in 2 hours. Men aren't fired—are kept busy figuring out how to keep machine busy. This robot about size of two upright pianos. Girl stacks cards full of holes in slot. Robot does maybe 50 or 100 calculations in minute or less and punches lot more holes in card. Automatic printing machines (which look a lot more impressive than the calculator) then make sense out of these holes and type out words and figures about 50 times faster than the boss' secretary can type. Robot's innards are some 1,700 tubes like in your radio, plus other things called diodes, transitors, resistors and some I can't remember. It thinks with them. Really does. Can work any kind of mathematical problem up to 10 digits. Therefore no good in figuring the national debt, but o.k. for an oil company. Doesn't work on decimal system, though answer comes out that way. Uses binary system which is like counting one at a time on fingers like I do only never runs out of fingers like I do. Only trick is it takes a graduate engineer-mathematician to set up brain for each problem. This done by turning lots of knobs and plugging in dozens of wires and jacks like on telephone switchboard only more complicated. Once set up, brain will solve up to 150 similar problems per minute. Rem-Rand factory man—he hangs around whenever machine runs to keep it on the beam—swears it's impossible for brain to make mistake. If answer doesn't prove out it flashes signal and man puts in new tube or something. Has memory, too. No kidding. Plug-in storage units remember figures, formulas, etc., and include in calculations when called for. Brain can handle any problem which can be set up for 9 inputs, 9 fields, 57 digit positions times 20 constants plus 8 storage units, multiplied by 40 . . . 40 something. Can't figure out rest of my notes. Gone to get a drink."

Definite Success

WE don't blame seismologists for claiming all possible credit for oil discoveries due to geophysical prospecting methods, but the other day we ran across a claim which, while indisputable, seems to be stretching things just a bit. Perhaps this writer had his tongue in his cheek, but in reporting on recent discoveries in West Texas he listed a shallow discovery in Mitchell County as "definitely a seismic success," adding that "oil was found in shot holes during a seismic survey of the area."

—Henry D. Ralph

BAKER

The "FIRST" Name in Floating Equipment

"First" in the Field

To have been the pioneer in developing and marketing floating equipment means little unless the wealth of knowledge acquired through years has been utilized to attain the position of "leadership" today.—By studying the performance of Baker Floating Equipment in cementing thousands of wells; by continuous "pioneering" as new materials could be incorporated into proven, as well as experimental designs, Baker always has maintained the lead, and is today unquestionably "First" in the Field.

"First" in Successful Results

Success in cementing means only one thing—to secure a leak-proof water shut-off with the initial cement job—and Baker Floating Equipment offers you the best possible opportunity to secure such success. Let us consider the features of Baker Equipment which contribute to Successful Results... Seamless steel collar stock, threaded to *exactly* fit your casing, is a long-time Baker "Standard." The rounded nose of all Baker Shoes is made of "Baker Formula" Cement, and will safely guide the casing past all side wall irregularities. The famous Baker Buoyant Ball permits free passage of the cement slurry; then, at the slightest reversal of pressure, floats to a leak-proof seal against the recessed, abrasion-resistant rubber ring.—All internal construction consists of easily drillable materials, with *no metal* to drill out or to interfere with diamond coring immediately below the shoe. The bit meets the very minimum cross-sectional area of plastic (and no metal) when drilling out, and quickly reduces the cement and plastic to harmless fragments which circulate out of the hole.

"First" and ONLY "Whirling" Action

This exclusive Baker development is widely used by operators who are willing to pay slightly more for this added assurance of success, especially when bridges are present in the hole. The baffled side ports in Baker WHIRLER Equipment direct the fluid at an angle against the walls of the hole, and this action combines with the hydraulicking effect of the fluid through the bottom of the shoe to remove bridges and permit safe landing of the casing. In addition, the well is conditioned to permit bonding of the slurry with the formation.

"First" in Popularity

Here is a "First" possible only because you (and thousands of other operators) have been quick to recognize tools and methods which *provide dependable performance*. It is both a challenge and an inspiration to work with men who *insist upon results*—a challenge to supply their present needs, and an inspiration to meet their demands of tomorrow. Baker will always be ready!

BAKER OIL TOOLS, INC., • Houston • Los Angeles • New York

NO METAL • NO TRICKS • NO TROUBLE DRILLING OUT

This is Product No. 100—Baker Cement Float Shoe—outstandingly "First" for the safe guiding, floating and cementing of casing. No other shoe approaches its world wide popularity. Available also in the "Whirler" Type at a nominal increase in price.

This is Product No. 102—Baker Cement Guide Shoe. Used in combination with a Baker Cement Float Collar when one float valve is considered sufficient, and a stop for the cementing plug is desired above the shoe.

This is Product No. 101 M&F—Baker Cement Float Collar—usually positioned just above the shoe joint to provide a "stop" for the cementing plug. Used in combination with any type of Baker Cement Shoe selected to meet customer's specifications.

Brings "LASTING" Results

Something is missing in Gulf Coast development

IN every sector save one the oil and gas industry of the Gulf Coast is making rapid strides.

Inland from the Gulf of Mexico in a huge crescent several counties deep and sweeping across three states is a petroleum empire producing about a quarter and refining about a third of the nation's crude oil, containing its biggest reserves of natural gas, and embracing much of its fast-growing petrochemical industry.

This growth is due to three things: The presence of natural resources, state laws which foster their development, and an aggressive industry. Encouraged by the first two factors, oil men have performed remarkable feats in overcoming obstacles of swamp and water, rock and sand, depth and pressure.

The oil industry of the Gulf Coast exemplifies how the resourcefulness of private enterprise, under the spur of free competition, can transform empty areas into thriving industry and latent resources into useful products.

BUT off the beaches the waters of the gulf roll ceaselessly over vast petroleum reserves, splashing only occasionally against a structure erected to bring oil and gas from the submarine deposits.

There should be many more such installations, for the nation needs that offshore oil. The presence of oil in the gulf was long suspected, but its development posed baffling problems until the oil industry, encouraged by the coastal states, contrived ingenious ways of reaching it.

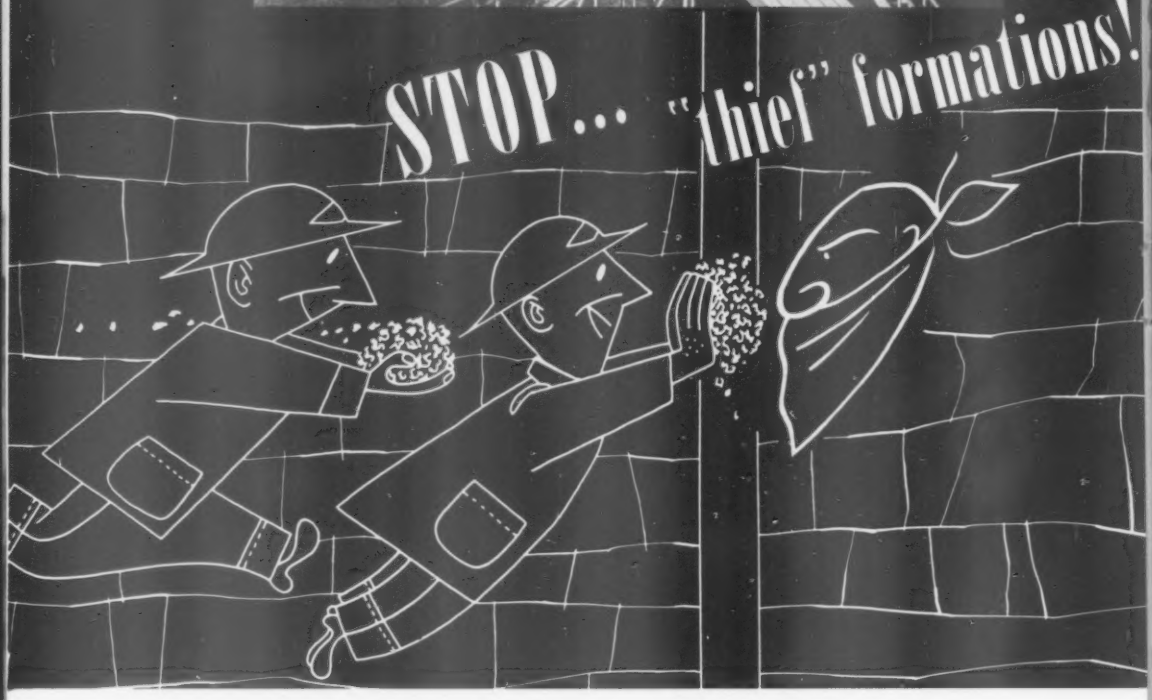
Then, suddenly, development stopped. The dead hand of government fell upon the waters. A strange doctrine of "paramount right and dominion" was enunciated, under which federal bureaucrats assert not ownership but the authority to control oil development.

To date that assertion of paramount right has brought stagnation instead of development, politics instead of industry, words instead of oil. Above the beaches there is bustling industry and the expanding production of goods for human wants; beyond the beaches nothing but federal dominion.

WHAT is missing from Gulf Coast oil development is freedom for the industry to move across the beaches to develop the known resources of the gulf floor. It has the know-how and the capital, is ready, willing, and able, to tap this part of the nation's natural wealth and develop it for the benefit of the entire nation just as development of oil under land surfaces has benefited the entire nation.

The Gulf Coast today is a striking lesson in the effects of government control: Onshore, encouragement of the creation of wealth; offshore, paramount right over empty waters.

STOP... "thief" formations!



JELFLAKE ... pound for pound ... your best protection against lost circulation!

Weigh the advantages of lost circulation materials and you will find that Jelflake fragmented plastic foil gives you the most value for your dollar. Because the average thickness of Jelflake is only 1/1000 of an inch, you get greater square foot coverage with each pound!

You can insure against costly mud losses with this tough, thin material that filters out on formation walls —seals off "thief" formations. It is quickly and easily used, holds its strength, will not ferment. Jelflake's crinkled surface prevents it from balling, and its low specific gravity allows it to remain in suspension in drilling mud for an indefinite time. Jelflake pumps easily through pump valves and circulating equipment, and its properties are not adversely affected by water, oil, mud chemicals, bacterial action or high bottom hole temperatures and pressures.

Jelflake is also used to prevent loss of cement slurry during cementing operations. Packaged in strong, wet-proof 25-pound bags, Jelflake is sold everywhere. Ask for Jelflake at your nearest mud distributor, supply store or Dowell station today.

DOWELL INCORPORATED
TULSA 1, OKLAHOMA
Subsidiary of The Dow Chemical Company

Keep Jelflake Handy!

Ask your nearest Dowell station for complete information on these Dowell services and products: Acidizing Service, Electric Pilot Services, Plastic Service, Perfo-Jet Service, Chemical Scale Removal Service for heat exchange equipment, Jelflake, Paraffin Solvents and Bulk Inhibited Hydrochloric Acid.

"First in Acidizing . . . since 1932"

Look to **DOWELL**

FOR OIL INDUSTRY CHEMICAL SERVICE

THIS WEEK

GULF COAST HAZARD . . . High pressures and large gas-oil ratios are typical of conditions frequently encountered on the Gulf Coast. This gas well blew out and cratered, and the gas was set fire purposely to limit the danger. At the right is a relief well being drilled directionally to control the wild well. It is the Sam Harrison 1 Willie L. Boehm, 1 mile east of Ganado, Jackson County, Texas.

INDUSTRY.—New Houdry-designed method of completing combustion of waste gases now being tested in refineries of three companies. . . . Idea uses bundles of porcelain rods serving as catalyst to complete oxidation of exhaust fumes. . . . ¶Amerada extends production trend in North Dakota another 5 miles with new strike north of its northernmost producer. . . . Well flows at rate of 672 bbl. daily on drill-stem test. . . . ¶More accurate means of measuring gas flow through large-diameter pipe line expected to result from tests now being made at Refugio, Tex.

INTERNATIONAL.—Fiery speech by Iran's emotional Premier Mossadegh opens hearing of oil-nationalization dispute before the International Court of Justice at The Hague. . . . The court's first ruling will be on Iran's charge that it has no jurisdiction over the dispute, then the question will be considered on its merits. . . . British position is that the oil seizure violated international law since its concession agreement amounted to a treaty, disputes over which fall within the court's jurisdiction. . . . Decision may not be known for weeks. . . . ¶Cortemaggiore-Turin natural-gas pipe line and a new 106,000,000 cu. ft. daily natural-gasoline plant at Cortemaggiore in Italy are placed in operation adding another link to the country's natural-gas system—already the most extensive in Europe. . . . Caltex and Philippine Government discuss possible construction of 13,000-bbl. refinery in the islands. . . .

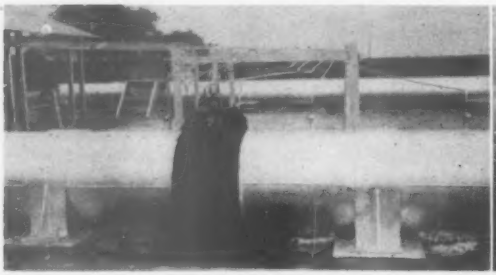
REFINING.—Derby Oil engineers describe unusual refining feat at Wichita meeting of W.P.R.A. . . . Company completed construction and began operations of its new T.C.C. unit before completion of the topping unit which was to supply it with crude. . . . ¶First cans of oil exhibiting the new A.P.I. lube designations will be placed in service stations within 6 to 8 weeks, Penn Grade Crude Oil Association is told. . . . Oil companies will begin to notify distributors, customers, and other interested parties within the next month. . . . ¶Texas City Refining acquires all of remaining stock in former Petrol Terminal Corp. and immediately lets contract for installation of a 19,000-bbl. Houdriflow catalytic cracking unit at Texas City, Tex. . . .

ACTIVITY.—Production of crude and lease condensate averaged 6,106,400 bbl. daily for week ended June 7. . . . ¶Total well completions amounted to 907, compared with 935 for previous week and 802 for same week in 1951. . . . ¶Wildcat completions decreased 6 wells to 185. . . . ¶Rotary rigs operating in United States on June 9 totaled 2,813, up 6 for the week. . . .

TRENDS.—Refinery production of gasoline for week ended June 7 was 70,000 bbl. daily greater than same week last year. . . . ¶Gasoline stocks increased 317,000 bbl. daily more than last year. . . . ¶Indicated demand on refineries for gasoline was 247,000 bbl. daily less than last year. . . .

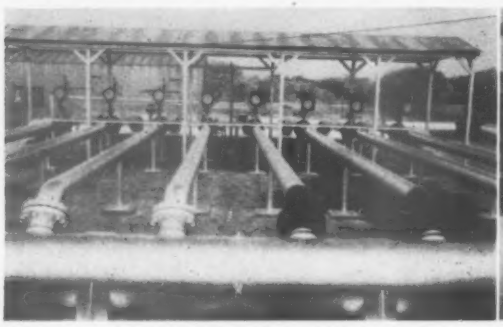
TIDELANDS.—Vote to override President's veto on tidelands bill is held up as Senate uncovers plot by the Interior Department to take over and operate the offshore oil reserves by having them declared surplus property. . . . Plan apparently was worked out by the solicitor of the Interior Department and sanctioned by the Justice Department. . . .

ECONOMICS.—Combined imports of crude and products and combined exports of both showed increases during April, Commerce Department reports. . . . Imports set all-time record for the month and were only slightly below January total. . . . ¶Study shows refined-products stocks dropped 33,013,000 bbl. as a result of oil strike. . . . Loss was during a period when stocks normally increase. . . . Situation indicates need for increase in runs of 165,000 bbl. daily through first quarter of next year. . . .

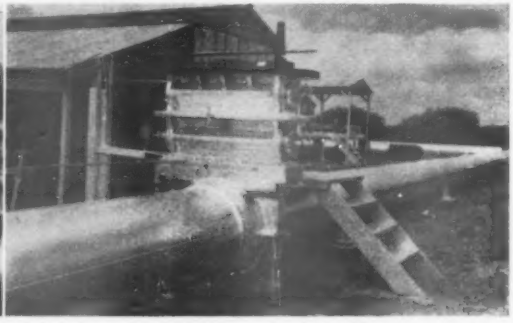


1 Gas flowing through 30-in. line passes through flanged orifice for first measurement. Small lines connect with A.G.A.-A.S.M.E. standard meter taps.

2 From the 30-in. line natural gas passes into 30-in. looped header, which equalizes flow prior to entry into smaller check lines at right.



3 Gas from the 30-in. header passes through eight 10-in. lines, each of which is equipped with a meter.



4 After metering on 10-in. lines, gas is returned to 30-in. line and again is metered as it passes through an orifice fitting.

Gas-Measurement Check

Industry experts seek more accurate metering of big-inch systems by cross check with flow through smaller lines

F. Lawrence Resen

REFUGIO, Tex. — Greater accuracy in the measurement of gas flowing through large-diameter pipe lines is expected to be possible as the result of tests now under way at a $130,000 installation here.

Coefficients will be determined for orifice meters for 30-in. lines. At present the coefficients for large orifice meters are not very accurate, since they have been extrapolated from data on smaller orifices. As a result, the measurement of the volumes of natural gas flowing through large transmission lines has been subject to an appreciable margin of error.

A check on the performance of large orifice meters will be made by comparisons with the same volumes of gas flowing through smaller meters, the accuracy of which has been established through earlier test projects.

The test is a cooperative project, jointly sponsored by the American Gas Association and the American Society of Mechanical Engineers, and assisted by the National Bureau of Standards. Gas for the tests is being supplied by Tennessee Gas Transmission Co., which has two 24-in. trunk lines passing the site. A number of equipment manufacturers and gas companies loaned material and labor for the project. The test is part of a study of gas measurement begun in 1948 by a joint committee of A.G.A. and A.S.M.E.

The installation takes in 550,000 M.c.f. of gas daily at approximately 700 psi. The gas goes through a 30-in. line equipped with orifice meters and then into a large header. From there it is passed through a battery of eight 10-in. lines each fitted with an orifice meter of known accuracy, and finally the gas returns to the mains through another 30-in. line fitted with still another meter.

PROJECT HEADS are, left to right, Earnest E. Stovall, Lone Star Gas Co., Dallas, chairman of the subcommittee on testing large-diameter meter tubes; H. S. Bean, National Bureau of Standards, Washington, chairman of the joint A.G.A.-A.S.M.E. committee; and T. J. Filban, A.G.A. project engineer.

The meters are elaborately equipped with precision recording instruments so arranged and lighted that comparative readings may be photographed for study. A large number of various types of tests of meter performance will be

TEST WITNESSES included, left to right, standing: H. T. Collett, National Bureau of Standards; Wayne Coffman, Cities Service Gas Co.; H. H. Shelton, El Paso Natural Gas Co.; O. H. Moore, Tennessee Gas Transmission Co.; W. H. Osborne, Chicago Corp.; R. L. Rountree, United Gas Pipe Line Co.; C. G. Moorehead, Hope Natural Gas Co.; N. B. McKinney, Lone Star Gas Co.; and J. S. Clifford, United Gas Pipe Line Co. In the front row are J. B. Corzette, Daniel Orifice Fitting Co.; C. M. Carter, Tennessee Gas Transmission Co.; E. E. Stovall, Lone Star Gas Co.; H. S. Bean, Bureau of Standards; T. J. Filban, American Gas Association; T. B. Davis, United Gas Pipe Line Co.; and M. L. Sheehan, Parker Appliance Co.

conducted at the Refugio installation, and coefficients calculated from the data will be published by the two associations.

The gas industry will benefit from more accurate measurement through: (1) better determination of the volume of gas flowing through large lines, (2) more effective control of leakage and line losses, (3) more efficient maintenance through knowledge of when a line requires cleaning.

Catalytic "Desmogger"

New Houdry-developed unit, now undergoing tests, said to recover waste heat and eliminate atmospheric pollution

George Weber

NEW YORK.—A new unit which promotes complete oxidation of combustible waste gases by catalytic action now is being tested in refineries of three oil companies, according to Eugene Houdry, developer.

The first commercial application, for a metal-coating company, has proved successful to date in burning the fumes emitted from baking ovens and is said to have reduced the plant's fuel bill by 90 per cent.

The catalytic unit consists of a number of small porcelain rods, which are coated with a 0.003-in. film of alumina and platinum alloy. The rods are arranged to permit maximum contact with passing gases.

Groups or layers of these rod units, when placed in a stack, complete the burning of gases and permit substantial additional heat recovery, Houdry reports. Thus they perform a dual function of eliminating atmospheric pollution and recovering waste heat.

Work on the project is being handled by Oxy-Catalyst Manufacturing Co., Inc., of Wayne, Pa., a firm headed by Houdry.

Trial runs . . . Last week Sun Oil Co. installed a number of the units in one of the Houdry fixed-bed catalytic cracking plants at its Marcus Hook, Pa., refinery. However, the company will have nothing to report until the test has been under way for several months.

A western refinery is using the units experimentally in an attempt to remedy a smog situation. Here heavy hydrocarbons adhering to spent catalyst charged to a catalyst cracking unit regenerator are being vented unburned with the flue gas. This results in a visible yellow plume leaving the stack of the regenerator. It is believed that the new combustion units installed in the stack will correct the situation.

Other applications . . . In addition to its probable use in petroleum refining, the new technique is reported to have a great potential for applications outside the industry.

The units will prove most beneficial in cases where substantial volumes of combustible gases are being vented unburned to the atmosphere.

Such cases are by no means restricted to industrial and power plants. In fact, one of its most important potential applications lies in completing the combustion of exhaust gases from motor vehicles and home-heating units.

It is understood for example, that the Houdry approach is being investigated by the City of Los Angeles as a possible means for reducing the tremendous volumes of noxious vehicle-exhaust fumes which contribute so greatly to the smog problem in that city.

Although the new Houdry development bears the name of the same man who gave the petroleum industry its first catalytic cracking process, there is no corporate relation between Oxy-Catalyst Manufacturing Co. and Houdry Process Co., which licenses catalytic cracking and reforming processes.

ROCKY MOUNTAIN

New Dakota Strike

Amerada moves production another 5 miles northward

WILLISTON.—The north-south distance between production on North Dakota's Nesson anticline has been stretched another 5 miles.

It is now 54 miles from the southernmost producer on the tremendous anticline, Amerada 1 Binhomer-Risser, to the northernmost indicated discovery.

The new strike is Amerada Petroleum Corp. 1 Skaar, C NE SW 13-158n-95w, Williams County. It flowed oil at a computed rate of 672 bbl. daily based on a 1-hour drill-stem test of the Madison limestone at 8,190-8,220 ft. A previous drill-stem test at 8,034-82 ft., also in the Madison, recovered 150 ft. of slightly gas-cut mud.

Nearest production is at Tioga pool, 5 miles to the south, where Amerada 1 H. Bakken was completed in April for 25 bbl. per hour and Amerada 1 L. Bakken, a northeast offset was completed in May for 21 bbl. per hour. Both completion tests were through ¼-in. chokes. Production in the wells was found in the Madison at 8,312-50 ft. and 8,258-90 ft., respectively.

Whether the 1 Skaar is an extension to Tioga field or on a separate structure will have to await the determination of the water level in the indicated discovery and perhaps additional drilling in the gap between the production.

The indicated discovery is 16 miles north of the Beaver Lodge discovery well, where Amerada made the initial North Dakota discovery a year ago last April.

Beaver Lodge field now has 12 producing oil wells. All wells produce from the Madison in this field at intervals between 8,400 and 8,600 ft.

Tidelands Plot Outlined

Offshore areas were to be declared "surplus property" and assigned Chapman to "sell or lease," O'Mahoney reports

Bertram F. Linz

WASHINGTON.—A plot of the Interior Department to take over and operate offshore oil reserves by having them declared surplus property came to light last week and threw the Senate into an uproar.

Senators O'Mahoney of Wyoming and Holland of Florida got wind of it and finally pried most of the details from reluctant officials. The scheme was this:

If Congress fails to override the President's veto of the bill returning tidelands administration to the states, the General Services Administration is to declare offshore oil lands surplus property. The White House would then issue an executive order turning the lands over to the Interior Department to sell or lease. Interior, obviously, wouldn't be interested in selling but would set up rules for leasing and development.

How it developed . . . Apparently the idea was worked out by the solicitor of the Interior Department and sanctioned by the Department of Justice. The solicitor of GSA went along "reluctantly" and drafted a "tentative" order for the transfer. Interior has prepared an executive order but it has not been submitted to the President.

These disclosures caused the Senate judiciary committee to hold up action on the tidelands veto, and a vote on overriding is not expected in the Senate until this week.

O'Mahoney brought the matter to the Senate's attention by reading a letter he had written to Interior Secretary Chapman asserting (1) that the President's 1945 executive order on the Continental Shelf placed submerged lands under the care of the Interior Department until Congress should enact legislation, and (2) that the surplus property law cannot be stretched to apply to offshore oil reserves.

O'Mahoney's statement . . . "By the executive order of President Harry S. Truman, these submerged lands were reserved and set aside and placed under your control pending specific legislation by the Congress of the United States," O'Mahoney told the secretary.

"You cannot have it any other way. Officials of every executive branch of the Government that has any interest in the submerged lands have been testifying for years before my committee in support of the needed legislation which the President had in mind.

"If the surplus property law or the Federal Property and Administrative Services Act of 1949 had any application whatsoever to these lands, then the secretary of the interior and the solicitor general of the United States have been wasting their time when they appeared before my committee urging the enactment of still another law.

"Finally, let me say that if the Federal Property Act can by tortured construction be held to apply to the submerged lands, then some future executive could use the same law, not to lease these valuable deposits, but to sell them or even to give them away. The power to lease is only one of the powers of disposal granted by the Federal Property Act. It provides also for

DRIFTING SAND in West Texas dunes make tough going . . .

FLYING SAND in a dust storm is hard on drilling crews . . .

Sand and Oil

The sand of West Texas, both on the ground and in the air, often means trouble for oil operators, as shown in these two views of Cities Service operations in Ector County. Sand dunes make tough hiking for a geologist doing surface work in the continuing search for areas which might mean future oil fields. Spring dust storms are one of the occupational nuisances of West Texas drilling crews, in spite of the windboard which are installed on derricks to provide some protection.

sale, exchange, permit, or transfer 'for cash, credit, or other property, with or without warranty.'

"If without specific legislative authority, which the President had in mind in his Executive Order No. 9633 of September 28, 1945, the administrator of general services can designate or authorize the secretary of the interior to lease the submerged lands under executive rules and regulations, then he has equal authority to permit the secretary or any other executive agency to sell or exchange these lands, and even to transfer them for other property with or without warranty.

"It is altogether too unrealistic a concept to be entertained for a moment, particularly in the face of the perfectly proper order of the President reserving and setting aside these lands pending congressional action," O'Mahoney concluded.

Possible significance . . . During the debate, O'Mahoney held that the Surplus Property Act did not supersede the executive order, hence Chapman's plan would put the administrator of general services "in the absurd position of having authority to grant to the secretary of the interior power over an area which already has been put into his hands."

It would be difficult to believe that the Justice Department was urging the enactment of legislation and at the same time telling the secretary there was already legislation on the statute books sufficient to cover the matter, hence, O'Mahoney said, he was confident that Chapman would not go through with the plan.

Under a plan such as this, O'Mahoney said, no oil company could hold any lease with any security. Other senators went further and pointed out that the same theory that Chapman used to put the submerged lands under federal administration could be applied to take over steel, hydroelectric power, or practically anything for which the federal Government had a desire.

Chapman's statement . . . Holland later released a letter Chapman had written the two senators explaining that the whole thing was in a tentative and exploratory stage, saying:

"In summary, it may be said that this department has made a thorough study over an extended period of the possibility of expanding, under existing federal legislation, the program of oil and gas operations which certain coastal states began in the submerged lands of the Continental Shelf prior to the institution of the litigation that resulted in Supreme Court decisions holding such lands and mineral resources to be federal assets rather than assets of the coastal states.

"This study was instituted and carried forward because of the responsibility of the Secretary of the Interior, as the administering official, to explore every reasonable possibility of bringing these mineral resources into production in support of the defense effort. I believe that the effort has been fruitful through the discovery of Section 203 of the Federal Property and Administrative Services Act of 1949 as providing a possible statutory basis for the issuance of leases on the oil and gas deposits on the Continental Shelf.

"However, there has been no final decision on the policy question as to whether the executive branch should or should not proceed under the authority of that section in the absence of new legislation dealing expressly with the problem of the development of the oil and gas deposits in the Continental Shelf."

Surprise in Europe

Greatly expanded output of European oil equipment helps boost refinery production far above U.S. expectations

WASHINGTON.—The European oil industry in the past 4 years has developed nearly three times as much refinery production as was expected.

And this has been accomplished with a dollar expenditure nearly 20 per cent less than originally thought required, according to the Mutual Security Agency, which has taken over the responsibilities of the Economic Cooperation Administration.

While world statistics are so set up that it is impossible to trace all the items that go into petroleum equipment, MSA estimates that $250,000,000 has been spent for dollar equipment and American technical know-how in Europe and North Africa during the 4 years that will end June 30. Refinery capacity has been increased in that period by 764,000 bbl. per day.

The original estimates of the Organization for European Economic Cooperation placed the expected requirement for specialized oil equipment from the United States at $309,400,000 and contemplated an increase of only 282,000 bbl. daily in refinery capacity.

The latest estimates, made last fall, place dollar expenditures for the expansion program at approximately $170,000,000—half for materials and equipment and the other half for engineering fees and royalties. Of this total, the United States has agreed to finance $37,000,000.

Exploration, production . . . Crude-oil exploration and production projects in Europe and North Africa also have been financed at an estimated total expenditure of $3,100,000, representing purchases of specialized United States equipment almost exclusively.

In addition, $500,000 of equipment purchases was financed by MSA in connection with the construction of new pipe lines in France and Italy and new tankage in Greece.

The total cost of material and equipment required for maintenance, repairs, and operations can be estimated only on the basis of established industry formulas. As an "informed guess," MSA places it at $25,000,000 to $30,000,000 for the European refinery industry with another $10,000,000 for development of European oil fields. The United States has financed $5,600,000 of the oil-field expenditures.

The accomplishment of a large refinery expansion at a dollar cost so far below what was estimated, in the face of the higher prices which have developed in the past 4 years is attributed to a great expansion in the output of the European petroleum-equipment industry and the opening of European offices by American engineering forms to decrease the dollar cost of the technical services provided.

Oil imports . . . More accurate figures are available for European imports of oil. The State Department in 1948 estimated that Marshall Plan countries would spend approximately $1,900,000,000 in dollars for oil during the 4-year period, and present estimates are slightly more than $2,000,000,000. The closeness of these figures, it is explained, is due principally to the fact that different trends, affecting the total, offset one another rather than to any unusual accuracy in the original estimates.

Total imports by volume were actually more than a third higher than the 1948 estimate, but the bulk of this increase took place in nondollar oil, which increased nearly 60 per cent.

Retail market shares in Europe remained relatively unchanged as between United States and British companies, and the decrease in the relative proportion of United States company oil imported into Europe is principally due to a decrease in purchases by British

WATCHING WASHINGTON

Bertram F. Linz

Dreaming Up a Trust

Next big target of the Department of Justice may be the retail-gasoline pricing practices in the oil industry.

The antitrust division repeatedly has studied the retail-gasoline price situation but so far without turning up anything it could get its teeth into. It apparently holds the theory that competitors shouldn't charge the same price for their product—even if it is identical in character.

Discussing his work recently with a Senate committee, Assistant Attorney General H. C. Morison said "a particularly troublesome problem resulting from concentration of economic power arises in those industries in which a relatively few large-scale, heavily financed companies of comparable size and dominant in production and distribution decide that they will not engage in active price competition with each other.

"In many industries," Morison explained, "there exists a 'follow-the-leader' policy of pricing and selling. Each member of the industry individually elects to follow the policy of not changing his prices until one or more 'leaders' change their prices, and each company individually elects to charge precisely the same prices as the leaders.

"If the government can establish the existence of an actual or tacit agreement among these companies to adhere to and follow the prices and market practices of the leader or leaders, then the companies can be charged with a conspiracy or combination to monopolize or restrain trade. In some instances, however, it is not possible to find evidence of an actual agreement, and some courts have indicated a reluctance to 'infer' the existence of a conspiracy in the absence of direct evidence of some agreement. Yet the effect upon competition is precisely the same as if the different companies had explicitly agreed among themselves to follow this practice."

New Slant on Imports

United States and Venezuelan officials attempting to negotiate a new reciprocal-trade agreement on oil reportedly now are considering abandonment of the United States import quota and adoption of a formula for imposition of the import tax on the basis of quality.

The original Venezuelan demand was for elimination of the quota and reduction of the already-cut import tax to 5.25 cents per barrel, but the State Department refused to make the double-barreled concession, in which, apparently, it saw possibilities of difficulties in relation to imports of oil from other areas.

In Washington, the department has imposed a security clamp on all officials conversant with the negotiations. In other quarters, however, it is reported that the discussions in Caracas have turned to the possibility of a tax of 5.25 cents per barrel on crude below 25° gravity and 10.5 cents per barrel on lighter crude.

The split tax, it has been suggested, would take care of the Venezuelan situation without extending any great advantage to other foreign oil-producing countries, which, under our most-favored-nation policy, would participate in any tariff concessions granted to Venezuela.

Synthetics Still With Us

Based on the experience of the past quarter-century and more particularly the last 12 years, the total United States demand for energy will reach some 80 quadrillion B.t.u. in another 25 years.

Back in 1926 the total demand for energy was 24 quadrillion B.t.u., and last year it reached some 39 quadrillion. That was an increase of about 60 per cent, but most of it was developed after 1940 and Solid Fuels Administrator Charles W. Connor estimated it will at least double in the next quarter-century.

On this basis, Connor recently told a group of coal men, while he does not hold to the belief that we are running out of oil, it will be necessary to develop new sources of liquid fuels to supplement the output of the oil industry.

The very weight of demand, Connor indicated, will make it necessary in the years to come to develop the synthetic-liquid-fuel industry, even aside from the national security angle.

companies and independents of oil from dollar sources for use in their own markets.

The total volume of United States company oil sold in Europe was 5.5 per cent higher than the 1948 estimates, while the quantity sold for dollars was, by a coincidence, almost exactly the same as the earlier estimate. The difference was sold for currencies other than dollars.

The unit value of the United States company oil averaged 5 per cent higher than the 1948 estimates, due to increases in Western Hemisphere crude and refined-product prices since July 1947, when the estimates were made.

However, the pattern of European imports shifted considerably more than was anticipated in the direction of greater quantities of low-priced crude and smaller quantities of high-priced refined products with the rapid expansion of European refining facilities.

Oil's Steel Shrinks

Fall construction will feel effects of strike

WASHINGTON.—As the steel strike continued through its second week there was no clear-cut picture in Washington as to its effect on the oil industry.

No one who might be in a position to know the facts was willing even to guess on its effects, and it was pointed out that an accurate appraisal of the situation would require a plant-by-plant check of fabricators to determine what inventories are, a similar check to determine what production will come from unstruck plants, and some knowledge of how long the strike will last.

Congress meanwhile turned down the President's request for legislation permitting him to seize the steel industry, order the strikers back to work, and, presumably, grant an increase in wages. In a special message, President Truman had requested such legislation as a result of the Supreme Court decision declaring that he had no seizure powers in the absence of congressional direction.

PAD estimates . . . Petroleum Administration for Defense officials estimate that previous interruptions of steel production cost 50,000 tons of oil-country tubular goods and 100,000 tons of line pipe, the two items now in shortest supply.

These estimates check with a rough figuring that runs this way: About 2,000,000 tons of steel are lost each week the strike lasts; PAD gets a little less than 9 per cent of the available

steel; therefore PAD losses about 175,000 tons a week—50,000 tons of tubular goods, 100,000 tons of line pipe, and 25,000 tons of structurals and miscellaneous.

Officials expressed the belief that summer storage plans will not be immediately affected by the strike, because the steel for early summer construction already has left the basic steel mills and is on to other stages toward eventual erection. But steel for building after September 1 has not yet left the basic mills and any prolongation of the strike would affect this program.

Tubular-Goods Plan

Conference is scheduled to discuss higher production

WASHINGTON.—A long-range program for stepping up the production of tubular goods will be discussed with 50 manufacturers and distributors invited to confer with Petroleum Administration for Defense officials in Washington June 20.

The conference has no relation to the steel strike but is designed to further PAD's world-wide oil expansion program. However, it was admitted by Deputy Petroleum Administrator J. Ed Warren, the strike has aggravated the continuing shortage of steel for oil and gas drilling which is the most serious materials problem now facing the petroleum industry both at home and abroad.

"PAD's oil-expansion program calls for a sharp increase in well drilling in the United States and other free countries during the 18-month period beginning July 1," Warren said. "This program is based on PAD's estimate of what the domestic and foreign segments of the petroleum industry are willing to do if only enough materials are available to them. It is a minimum program, large enough only to meet mobilization demands and to add slightly to the reserve capacity available for all-out war.

"It is becoming apparent, however, that if the expanded drilling program is to be realized, prompt steps must be taken to increase the output of casing, tubing and drill pipe."

EASTERN

PRINCIPAL SPEAKERS at the twenty-ninth annual meeting of the Pennsylvania Grade Crude Oil Association held in Pittsburgh included, left to right: Association President C. E. Streeter, an independent producer from Bradford; Leo J. Wilmeth, sales manager, Shamrock Oil & Gas Corp., Amarillo; J. Ed Warren, deputy administrator, Petroleum Administration for Defense, Washington; R. Cubicciotti, executive, L. Sonneborn Sons, Inc., New York; and W. L. Horner, vice president of Sunray Oil Corp., Tulsa.

Research Paying Off

Penn Grade producers getting a 160-to-1 return on their investment in recovery and other studies, Streeter says

PITTSBURGH.—Aggressive research is primarily responsible for maintaining Pennsylvania Grade crude-oil production at its present level. C. E. Streeter, president of the Pennsylvania Grade Crude Oil Association, said here last week.

Without research in secondary recovery and associated fields, he told association members convened for the twenty-ninth annual meeting, daily production in the area would be roughly 15,000 bbl. less than the present 53,000-bbl. level.

The added recovery of Pennsylvania crude which can be attributed to research conducted by the association and others, amounts to more than 19 million barrels worth $83,000,000, or 160 times the amount the association has spent on production research since the program was inaugurated, Streeter said.

From January 1 to the end of May, 890,000 bbl. of crude was added to aboveground stocks, much of it accumulated because four of the area's 16 refineries were shut down by the strike. Careful estimates indicate that 1952 withdrawals will average from 2,200 to 2,700 bbl. daily less than the 1951 average.

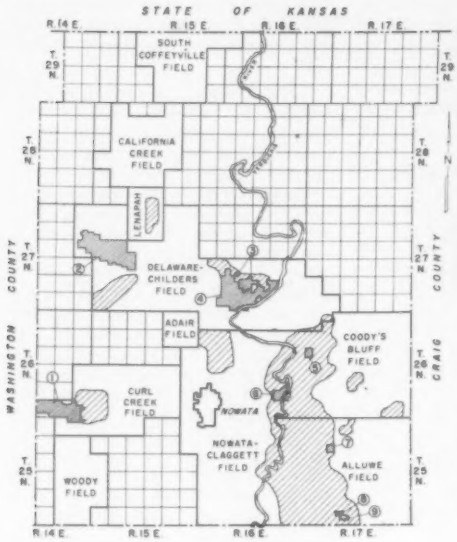
Drilling is up . . . Drilling activity so far this year is very encouraging, said Streeter, an independent producer from Bradford. In New York and Pennsylvania producing areas north of Kane and Clarendon, 687 wells was completed during the first 4 months of 1952 as compared with 415 wells during the same period last year. This indicates, he said, that 1952 may see more wells drilled here than were drilled in any one of the past 3 years.

Despite drilling resumption, high used-casing prices have brought about many well abandonments, which accounted for 1951 production falling 528 bbl. per day short of the projected withdrawal rates of 54,500 bbl. Abandonments are now slowing, due to the setting of ceiling prices on second-hand casing.

Marketing problem . . . The marketer's viewpoint on the industry was presented by Leo J. Wilmeth, sales manager of Shamrock Oil & Gas Corp., Amarillo, who voiced the opinion that the domestic oil industry has processed too much crude for the past year.

This has been brought about, said Wilmeth, by the continued publication by some that we need another million barrels daily of refining capacity. He did not question the need of this standby capacity for national defense, but he did question it on the basis of demand. Widespread comments on the need for refining expansion have affected the wholesale return on petroleum products.

Officers elected . . . Most officers of the association were reelected, including C. E. Streeter, president; George J. Hanks, president of South Penn Oil Co., Bradford, first vice president; C. A. Chipman, Bolivar, N. Y., independent, second vice president; Samuel Messer, vice chairman of Quaker State Oil Refining Corp., Oil City, treasurer; F. W. Alcorn, Pennzoil Co., Oil City, assistant treasurer; and C. L. Suhr, also of Pennzoil, assistant treasurer.



NOWATA County's waterflood activity is shown by large shaded areas. Smaller shaded areas are these projects: (1) Forest Oil Corp., (2) Delaware Consolidated Oil Co., (3) Pure Oil Co., (4) Sinclair Oil & Gas Co., (5) Forest Oil, (6) Phillips & Milan, (7) Wiley & Roberts, (8) Sinclair-Verdigris, and (9) Sinclair-Scudder.

ANNUAL TOUR MEMBERS gathered at Pure Oil Co.'s Robbins-Fister pressure plant. Left to right at sound car are S. W. McGaha, Lane-Wells Co., Tulsa; W. W. Gravenberg (back to camera), Pure Oil Co., Nowata; and J. Wade Watkins (with mike), engineer with the U. S. Bureau of Mines, Bartlesville.

Water Floods Checked

Nowata County, daddy of Mid-Continent's big water flood visited by 350 engineers and operators on annual tour

Kenneth B. Barnes

NOWATA, Okla.—Representative water floods of Nowata County, where the first major secondary-recovery operations of the Mid-Continent area were undertaken 17 years ago, were visited and studied recently by 350 engineers and water-flood operators.

Occasion was the annual spring water-flood tour sponsored by the Kansas-Oklahoma Water Flood Operators Association and the Northeast Oklahoma Oil Producers Association.

After the production technique developed in Pennsylvania's Bradford field was first applied in Nowata County in 1935, the method spread widely and rapidly throughout northeastern Oklahoma and southeastern Kansas, largely because the pay formations are quite shallow—400 to 2,200 ft.

Also following the Nowata "proving" the water-flooding technique took big hops to the Illinois basin, North Texas, the Gulf Coast, West Texas, California, and Venezuela.

Four Nowata floods, Nos. 1, 2, 3, and 4, on map, were inspected in detail during the 1-day tour. In addition, each registrant was given a copy of the new U. S. Bureau of Mines Report of Investigations 4896, "Water Flooding in Nowata County, Oklahoma," by John P. Powell and J. L. Eakin, both bureau engineers at Bartlesville. This new report supplies much operational and recovery information concerning the nine projects listed on the accompanying map.

Background . . . Besides being the pioneer water-flood area in the Mid-Continent region, this northeastern Oklahoma county can claim other distinctions in "firsts" or pioneering.

Some of its dozen oil fields were discovered and oil produced before statehood. Its original big drilling program was in 1905-12. During that time the area was a major Mid-Continent oil producer. The county's annual production reached its peak of 9.3 million barrels in 1910.

Vacuum was applied to Nowata's oil wells in 1913, and several natural-gasoline plants constructed at the same time. Use of air-gas injection started as early as 1917, and systematic pattern-type air-gas drives in 1932.

By 1952, Nowata County had produced 100 million barrels of oil by primary depletion. But due to the assistance of secondary recovery, it had produced 14 million barrels more by air-gas injection, and 35 million barrels more by water flooding.

The county has had some 100 water-drive projects covering about 10,000 productive acres. The oil production is now running about 2.8 million barrels annually, virtually all thanks to waterflooding.

Representative Projects

The 350 water flood tripsters saw a variety of development and operational conditions in the four recovery projects visited. Some high spots found on the tour (and detailed in U.S.B.M.'s R.I. 4896) were:

Forest Oil's No. 27 . . . This five-spot project covers 410 developed acres, has 30 ft. of sand at 1,045 ft. Flooding was initiated in 1943. Total water-flood oil produced to date has been 943,000 bbl.

Water supply is obtained from a local creek, with an 1,800-ft. Arbuckle limestone well a standby source. There are 81 input and 81 oil wells.

Cumulative water-flood oil recovery to first of year is 1,530 bbl. per acre, with cumulative water injection-oil production ratio being 6 to 1. Ultimate oil recovery by water flooding is estimated at 3,500 bbl. per acre; this is in contrast with but 2,686 bbl. per acre previously recovered by primary depletion.

Delaware Consolidated Oil Co. . . . Started in September 1949, flood development has now expanded to include 200 acres of the concern's large holdings. There are 32 ft. of sand at 1,042 ft. Average permeability is 50 md., porosity is 20 per cent. A five-spot pattern is used, with 660-ft. spacing.

An Arbuckle limestone well furnishes

water supply. Equipped with an electric multistage centrifugal pump set at 1,183 ft., this well can produce 15,000 bbl. per day with a fluid-level drawdown of only 650 ft. The project has 34 input and 20 oil wells.

As of the first of year, cumulative water flood oil production was 812 bbl. per acre, cumulative water injection-oil production ratio was 16-1; and oil production was running 500 bbl. per day.

Pure's Robbins-Fister . . . This new new project has 330 by 330-ft. five-spots on 115 acres.

There is 31 ft. of sand at 700 ft. Permeability averages 88 md., porosity 20.3 per cent, and connate water 26 per cent.

Water was first injected in April 1951; oil production picked up in June 1951. Oil production since has risen to several hundred barrels per day from practically zero.

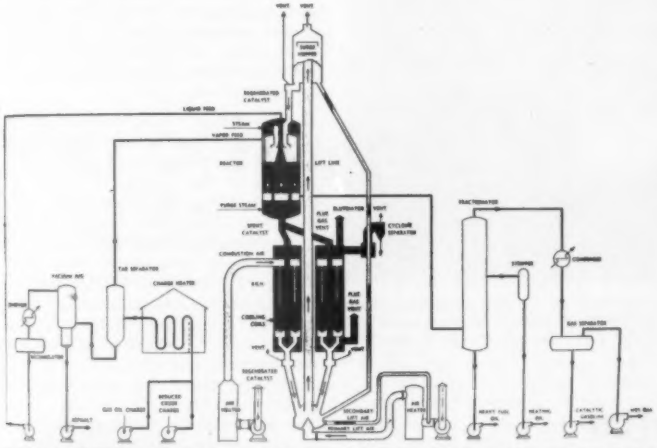
Sinclair's Security Fee flood . . . This 460-acre water flood (five spots, 330 and 440-ft. spacings) has been of particular technical interest because previously it was operated under intensive pattern-type air-gas injection.

Scattered gas injection was commenced in 1925, and five-spot pattern-type was adopted in 1932. The air-gas injection was quite effective, increasing oil production from 36,000 bbl. annually in 1932 to a peak rate of 179,000 bbl. in 1937.

It has been estimated that 2.3 million barrels would have been recovered as the economic limit by primary-production methods, and that vacuum and air-gas injection will recover an additional 1.6 million barrels.

Water from the Verdigris River is used. A feature of the water handling system is the use of two gravity-type filters constructed from the lower rings of 55,000-bbl. steel tanks.

Sinclair started flooding the property in February 1948. At the first of this year, 335,000 bbl. of oil had been recovered by flooding and it was estimated that more than an additional million barrels was in sight. This, in much shorter time, will be about as much as by the previous air-gas injection. And the total from the two secondary methods combined will be substantially more than the original primary recovery.



T.C.C. AIRLIFT . . . Flow scheme of the Type 45 T.C.C. catalytic cracking unit described at the W.P.R.A. Wichita meeting.

Unusual Operation

With topping unit still incomplete, Derby puts cracker on stream by using a charge stock of gas oil and crude

R. B. Tuttle

WICHITA. — Operating a catalytic cracker before completion of the topping unit which was to supply it with crude was the unusual feat performed by Derby Oil Co.

Two of Derby's engineers, F. J. Baird and E. J. Jones, told about it at the regional meeting of the Western Petroleum Refiners Association here June 12-13.

Derby had just added a Type 45 T.C.C. unit as part of an extensive program of modernization of its Wichita refinery and expansion of its rated capacity to 15,000 from 10,000 bbl. per day.

The cracker was ready to operate 30 days before the topping unit was completed, so it was operated on a mixture of 50 per cent raw crude and 50 per cent gas oil. This was charged at around 3,000 bbl. daily, although the design capacity of the cat unit is from 4,000 to 7,500 bbl. daily on a fresh-feed basis.

By operating the cracker at reduced charging rates and mild heat loads, no difficulty was encountered in keeping it on stream. During the last week of the 30-day period the new topping unit was used to dehydrate the crude oil, and substantially 100 per cent crude oil was charged to the cracking unit.

The Type 45 T.C.C. unit was described to the meeting by W. W. Hamilton, S. C. Eastwood, A. E. Potas, and E. A. Schraishuhn of Socony-Vacuum Oil Co., Inc., licensor of the process, and Derby's unit was inspected by those attending the meeting.

Improved efficiency . . . The Derby men reported great increase in efficiency as a result of modernizing the refinery, particularly through substitution of catalytic cracking for thermal cracking. The crude-charging rate was increased 22 per cent, gasoline yield increased 54 per cent, and heavy-fuel output dropped 43 per cent through total fuel-oil yield, including heating oils, remained approximately the same.

Realization for the entire refinery before and after installing catalytic cracking is shown in the accompanying table.

Petrochem future . . . Also on the W.P.-R.A. program was Dr. Gustav Egloff of Universal Oil Products Co., who painted a bright future for the petrochemical industry and urged refiners large or small to get into it.

The refiner's utilization of modern processes not only permits production

DERBY'S "BEFORE AND AFTER" FIGURES

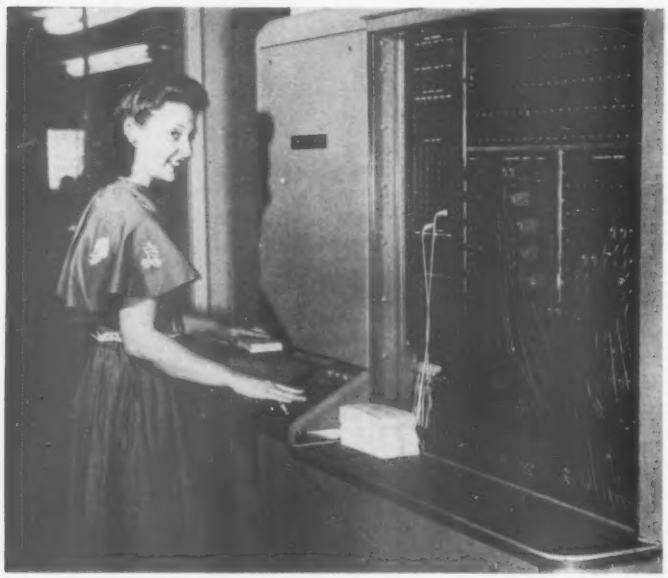
Products—	Price $/bbl.	Thermal cracking $/day	T.C.C. cracking $/day
Propane	1.93	87	143
Butane	1.89		346
Regular gaso.	4.25	12,975	19,945
Ethyl gaso.	4.67	4,754	7,304
Solvent	4.78	507	143
Tractor "A"	3.94	611	626
Tractor "B"	3.94	256	209
Kerosine	3.73	3,670	1,402
P.W. dist.	3.62	1,513	3,960
Straw dist.	3.36	17	97
Diesel fuel	3.73	4,689	3,920
Fuel oil	1.35	1,269	722
Road oil	2.84	3,138	3,638
Heating oil	3.36		1,052
		33,486	43,507
Realizations, $/bbl. charge		3.53	3.75

of higher quality, tailor-made products of exact specification but also increases the possibilities of entering the petrochemical business, Egloff said. Predicting that the output of petrochemicals will increase fourfold within 10 years, he declared that the future has great promise for those refiners who are prepared for tomorrow's markets.

The ability of the small refiner to produce petrochemicals profitably varies greatly with the conditions at each refinery, Egloff said, and depends on the kind and capacity of processes now in use, location, and type of crude used.

"In some cases," he said, "it is desirable to do no more than sell mixtures of hydrocarbons to chemical manufacturers while in others it may be expedient to install chemical plants for manufacture of such products as ethylene oxide and ethylene glycol. Existing refinery units may produce mixtures of products which can be made more valuable by installation of separation processes at the refinery."

INDUSTRY AFFAIRS



ONE DAY'S WORK for a skilled accountant is represented by the stack of punch-card run tickets in the girl's hand. When she puts them in Sunray Oil Corp.'s "electronic brain" the machine will do 28 calculations for each ticket and punch the answers in all the cards in 3 minutes.

Robot Calculator

Sunray speeds run-ticket computing with new "electronic brain"; machine's next task probably will be the payroll

Henry D. Ralph

AN "electronic brain," the first of its type in the oil industry, now is computing run tickets for Sunray Oil Corp. at the rate of one and one-half per second.

Properly known as the Remington-Rand Electronic Computing Punch, the machine can complete a series of complicated mathematical computations literally in the twinkling of an eye. A problem is fed into it on a punched card and the machine punches the answer on the same, or another card.

These punched cards have been used by Sunray for much of its accounting work for some time. The new machine fits into the middle of the company's calculating system and does in 2 hours what formerly took six men 8 hours to do.

Only seven of these machines have been produced. The first four went to the federal Government, the next two to other industries, and Sunray's is the first in the oil industry. Other types of electronic computers are being used by other oil companies for various purposes, but the Remington-Rand company claims that its machine is particularly well adapted to the routine accounting and record-keeping problems of large or a medium-sized company.

Sunray rents the machine from Remington-Rand, as it does the rest of its punch-card equipment, and the manufacturer keeps an engineer in the Sunray office constantly to maintain all the equipment and to set up new problems on the electronic calculator.

Such calculators rent for from $500 to $800 per month, depending on the volume and type of work contemplated, and Sunray estimates that it is more than paying for itself even thought it operates only about 2 hours a day at present.

Derry D. Deardorff, manager of Sunray's tabulating division, says that the company has enough routine accounting work adaptable to electronic calculating to keep the machine busy 40 hours a week, but it will take a year or more to accomplish this as manual operators must be shifted to other work and each particular accounting job must be adapted to punch-card procedure.

For run tickets . . . At present Sunray is using its electronic calculating punch only on run tickets, the monthly computation of the volume of crude oil taken into its pipe lines from each producing lease. The machine makes 28 mathematical computations on each ticket, at the rate of 48 cards per minute. Previously, manual operators, using desk calculating machines and tables of figures, made these computations at the rate of 100 to 125 tickets per day per man.

From penciled forms sent in monthly by Sunray's gagers in the field, manual operators punch holes in a card to give the basic information. The positions of the holes form a code to show such data as: date, state, name of lease, pipe-line system, gaging district, tank number, gravity of the oil, b.s. and w. factor, gravity, price, starting gage, final gage, and temperatures at start and finish of the run.

These cards are then fed into the electronic punch. The machine calculates and records the necessary steps to adjust the volume to 60° F., deduct the b.s. and w., and come out with the adjusted net volume and total value for each run.

The cards then go to automatic printing machines of the conventional type,

which decode the punched holes into words and figures and print statements giving the name of the lease, volume of oil taken, and amount owed for the period.

For taxes . . . A second card is used to figure the taxes on each month's run from each lease. A card is machine-produced with the basic information such as date and lease, the volume of crude, and the rates for the various state and federal taxes. The machine then computes each of the taxes and subtracts them to show the net value of the oil.

A third, or summary card, figures the division orders or ownership splits. Often both the royalty and the working interest in a lease are divided among a large number of firms or individuals, sometimes by small and odd fractions. The robot figures this, too, in a matter of seconds and records the answer in punched holes which are translated by the automatic printers.

Proving device . . . Very often an individual purchase figures out to a fraction of a cent, but payment is made at the nearest even cent. Such a situation calls into play an especially ingenious feature of the electronic brain. It has a self-proving device whereby a card cannot be punched until the problem has been worked backwards and comes out zero.

When the fractions are such that the total comes out a cent over or short, the machine could not prove itself and would stop operating. However, the odd cent is switched into a storage unit, or "memory," from which it is brought back for the proving-out process and then is sent into or taken from an "over and short" account. It is expected that this over-and-short account will about balance out in the long run and will never contain more than a few dollars.

Theoretically this machine can make 6,000 calculations and punch 150 cards per minute, but it would seldom run at top speed very long at a time because normally a different number of calculations is required for each card.

Payroll application . . . Sunray's next application of its new robot probably will be the payroll. Given the hours worked and rate of pay, the machine will easily figure out the gross earnings, social security tax, withholding tax, and any other deductions.

The machine can work problems of addition, subtraction, multiplication, or division, and so can do any sort of calculating which is broken down into these processes and properly programed on the control board. It can handle problems of any size, but this model's answer is limited to 10 digits.

Oil's Oversight

Reistle tells scouts and landmen they must do a better industry-selling job or face threat of loss of freedom

ALBUQUERQUE.—The oil industry has fallen down on the important job of selling itself and the free-enterprise system.

If the oil business is to remain free, individual employes and particularly scouts and landmen must adopt a program of selling their industry to the public, C. E. Reistle, Jr., director of Humble Oil & Refining Co. in charge of production, told the annual convention of the National Oil Scouts and Landmen's Association here last week.

C. E. REISTLE, JR.

By saying little, Reistle suggested, industry in general has permitted so-called liberals to "invest government control with a halo and business with horns and a tail."

The threat is particularly of concern to the oil industry, Reistle said.

Already, he added, shadows of things which threaten to come have been seen in the industry. "A federal grab of the tidelands, a slash in depletion allowances, price-setting of natural gas gathered by independent producers—these are all slices of power for which our lean and hungry bureaucrats are drooling."

Reistle told the scouts and landmen the best answer to the threat is for oil-industry employes to "learn everything we can about our capitalistic system and what makes it tick. And then, day in and day out, we must do a hard job of selling."

There is available, he said, ample informative material on the depletion allowance, proration, conservation, unitization, well spacing and other subjects from the Mid-Continent Oil and Gas Association, the American Institute of Mining and Metallurgical Engineers, the Interstate Oil Compact Commission, the National Petroleum Council, and others.

"I want to urge you," he said, "to make the fullest use possible of this source material. In that way you will be able to talk confidently and intelligently on our industry's big problems. And in that way you can become an effective spokesman not only for the oil industry but also for our individual enterprise system."

Marketing Assets Sold

STAMFORD, Conn.—Petroleum Heat & Power Co. has sold its oil-marketing division to Pittston Co. of New York for $8,000,000.

The company earlier had sold Oil Burner Manufacturing Co., another division, to Iron Fireman Manufacturing Co.

Petroleum Heat retains all the stock of its wholly owned subsidiary, Taylor Refining Co. The company's marketing division sold heating and fuel oils primarily on the East Coast and in Chicago.

Industry Briefs

WASHINGTON.—Charles J. Hedlund, with petroleum-economic division of Standard Oil Co. (N. J.) until he joined Petroleum Administration for Defense last March as a consultant, has been appointed director of the program division to succeed Cecil L. Burrill, who is returning to Creole Petroleum Corp. after 18 months in the post.

NEW YORK.—A 24,000-bbl. tanker for coastal and Great Lakes operation will be built this year for Socony-Vacuum Oil Co., Inc. The 300-ft. vessel will incorporate a retractable pilot house, folding masts and railings, and hinged stacks to permit it to pass under the low bridges of the New York State Barge Canal.

REGINA, Sask.—Bids have been asked by Saskatchewan Power Corp. for construction of pipe lines and distributions to provide the towns of Kindersley and Brock with natural gas from Brock field.

WASHINGTON.—Nestor C. Ortiz, State Department oil expert, will leave June 20 for Beyreuth to serve as petroleum attache in the legation to Lebanon. While assigned to Lebanon, he will have the whole nearby Middle East as his area of operations.

Lost: 50,000,000 Bbl.

Oil strike cost that much in refined products, first figures show, meaning runs must stay high for months

John C. Casper

THE nation lost about 50,000,000 bbl. of refined products during the strike which closed down about one-third of the refineries during most of May.

This is indicated by calculations based on the two weekly refinery reports released by the American Petroleum Institute, the first statistics making it possible to get a definite picture of the effects of the shutdown.

Total primary stocks of the four major products decreased 33,013,000 bbl. in the 5-week period ended May 31 or at the average rate of almost 950,000 bbl. daily. This was at a time when inventories are normally increasing. The average increase for May in the past 4 years was about 300,000 bbl. daily.

Stock picture . . . If stocks decreased 950,000 bbl. daily when they should have been increasing at about 300,000 bbl. daily, the actual loss for the four products was about 1,250,000 bbl. daily. Since these products represent about 87 per cent of total refinery output, total loss was 1,435,000 bbl. daily or a little more than 50,000,000 bbl. for the 5-week period.

Product imports during the strike were near normal, according to weekly reports by A.P.I., so, the loss was due to decreased refinery operations.

This calculation from total stocks assumes no abnormal reduction in total demand. However, the detail by products indicates a decrease in residual consumption. Residual imports were near normal, according to weekly reports of A.P.I. Variations in residual stocks have been very small for the past few years. The fact that heavy fuel stocks were not lowered by the decrease in refinery output indicates that consumption also was cut back.

On the other hand, refinery statistics for the first week in June indicate that the mad scramble for gasoline during the strike resulted in excess withdrawals of this product from primary storage.

Effect on refineries . . . Refinery runs for the week ended June 7 averaged 6,598,000 bbl. daily, which would have been near normal for early summer if there had been no strike. The increase in gasoline stocks for the first week of June, amounting to 1,295,000 bbl. or 185,000 bbl. daily, indicates that the fear of a shortage caused some secondary suppliers and jobbers to buy more gasoline in May than was required to meet current demands.

This abnormal increase in gasoline movement probably balanced the decrease for residual fuel resulting in a total demand level that was about normal.

To regain the 50,000,000 bbl. by the end of the first quarter of next year will require an increase in runs of about 165,000 bbl. daily. Normal runs for the last half of this year and the first quarter of 1953 have been forecast at about 6,790,000 bbl. daily. Refiners will have to boost runs to about 6,950,000 bbl. daily to meet the forecast demands.

Imports Increase

Crude tally is 585,000 bbl., new all-time record

BOTH imports and exports of crude and petroleum products increased in April, according to data released by the Census Bureau of the Department of Commerce.

Imports into continental United States averaged 970,000 bbl. daily in April, compared with 894,000 bbl. daily in March and 877,000 bbl. daily in April 1951.

Imports were only slightly less than in January of this year and established an all-time record for the month of April.

Crude imports reached the all-time high of 585,000 bbl. daily with increases over March reported for every supplying country except Borneo.

Receipts of crude from Venezuela averaged 369,400 bbl. daily, an increase of 85,200 bbl. daily over March.

The normal seasonal decline in imports of residual fuel reduced total product imports to 385,000 bbl. daily compared with 436,000 bbl. daily in March.

Exports of crude and products, excluding shipments to territories, averaged 461,000 bbl. daily, an increase of 90,000 bbl. daily over March but 62,000 bbl. daily less than last year's peak in August.

The largest increase was reported for distillate fuel. Distillate shipments in April were greater than during the winter months.

IMPORTS INTO CONTINENTAL UNITED STATES
(Thousands of barrels)

	Apr. 1952	Mar. 1952	Apr. 1951
Crude—			
Mexico	862	721	871
Colombia	1,685	1,472	1,818
Venezuela	11,082	8,811	8,518
Kuwait	1,379	939	1,708
Saudi Arabia	1,816	1,737	1,852
Borneo	173	436	314
Canada	336	70	
Other Middle East	203		
Total crude	17,536	14,186	15,081
Daily average	585	458	503
Products—			
Residual fuel	10,542	12,750	10,377
Other products	1,025	784	839
Total products	11,567	13,534	11,216
Daily average	385	436	374
Total all oils	29,103	27,720	26,297
Daily average	970	894	877

EXPORTS*
(Thousands of barrels)

	Apr. 1952	Mar. 1952	Apr. 1951
Crude	3,340	2,939	3,615
Gasoline	2,454	1,896	1,967
Kerosine	613	747	185
Distillate fuel	2,766	1,292	1,335
Residual fuel	2,243	2,059	982
Lube oils	1,285	1,751	1,344
Other products	1,123	†818	856
Total all oils	13,824	11,502	10,284
Daily average	461	371	343

*Excludes shipments to territories. †Revised.

Exports Remain High

WASHINGTON.—Despite the refinery strikes and the restrictions on shipments out of the country, exports of major products continued at a high level last month, averaging 235,400 bbl. daily during the week ended May 16, according to figures compiled by the Petroleum Administration for Defense.

The export average was 58,400 bbl. above that for the preceding week, due to a resumption of aviation gasoline shipments and a big increase in residual. Motor gasoline exports remained unchanged from the week ended May 9 and kerosine and distillate showed slight decreases.

Daily average exports of the individual products for the week ended May 16, compared with the preceding

week, and averages for the 4 weeks ended May 16 are shown in the accompanying table, in thousands of barrels:

	Week ended		Average
	May 16	May 9	4 weeks
Aviation gasoline	24.2		17.9
Motor gasoline	14.8	14.8	11.3
Kerosine	42.1	43.8	27.7
Distillate	68.8	73.4	61.4
Residual	85.5	45.0	79.4
Total	235.4	177.0	197.7

SOUTHWEST

Leases Go High

University sale of rights nets record $7,805,000

DALLAS.—The twenty-ninth public auction of drilling rights on Texas University lands has netted a record $7,805,000 in cash bonuses — nearly $500,000 higher than from any previous sale.

Land Commissioner Bascom Giles reported companies bid spiritedly for oil and gas rights on 125 tracts in West Texas and assumed obligations to drill six wildcats. The sale was held here under the direction of Giles and the University Board for Leases of Lands.

Four of the required wildcats will be projected to the Ellenburger, one to the Pennsylvanian, and one to the Clear Fork of the Permian. Two of the Ellenburger tests and the Clear Fork test will be drilled in Andrews County. Reagan and Schleicher counties each carry one Ellenburger obligation, and the Pennsylvanian test will be drilled in Crane County.

All tests must start within 180 days from June 6. Any may stop if granite is encountered above specified depths or if salt or sulfur water is found in the specified formation.

Highest bidder . . . Gulf Oil Corp. was highest bidder, paying $1,850,000 for 2,240 acres in northeastern Crane County. Drilling obligation calls for a test to 8,500 ft., or to salt or sulfur water in the Pennsylvanian.

Gulf's block includes eight parcels: The north and south halves of Section 3; northeast quarter and south half of Section 4; north half and southeast quarter of Section 9; north and south halves of Section 10, all in Block 30. The block adjoins Dune field on the east.

Second highest parcel went to W. A. Yeager of Midland for $1,025,000. This comprises a block of about 2,600 acres in southeastern Andrews County. Drilling obligation was for a 13,000-ft. Ellenburger wildcat. Yeager's acreage is in Sections 16, 17, 21, and 22, all in Block 1.

Humble Oil & Refining Co. paid a bonus of $800,000 for about 2,600 acres in northeast Andrews County, beginning 1⅜ miles east of Magnolia Petroleum Co.'s recent deep Ellenburger discovery.

Location is in Sections 9, 10, 11, 14, 15, and 16, Block 8. Humble assumed an obligation to drill an Ellenburger wildcat to 12,500 ft.

State Exploration Co. of Texas paid $65,000 for about 2,575 acres in 9 parcels in Andrews County. A 7,500-ft. Clear Fork test was required.

C. E. Hyde, of Fort Worth, assumed an obligation to drill a 9,500-ft. Ellenburger test in southern Reagan County. Cash bonus for rights here was $11,000 for 9 parcels totaling about 2,565 acres.

Sinclair Oil & Gas Co. paid $125,000 for 9 parcels totaling about 2,675 acres in northwest Schleicher County. Drilling obligation was an Ellenburger test to 9,500 ft. Acreage is in Sections 19, 20, 21, and 22 in Block 54, and in Sections 4 and 5 in Block 57.

CANADA

Delhi Active in Alberta

CALGARY, Alta.—Canadian Delhi Oils, Ltd., will continue to carry on an active gas-exploration program in Alberta despite the government's decision to permit no gas export this year from the southern portion of the province.

Anvily Raborn, manager and vice president of the company, said Canadian Delhi will keep a minimum of six rigs going and perhaps eight or nine. The company now is operating seven rigs—six in Alberta and one in Saskatchewan. An eighth will move into the Medicine Hat area shortly.

This was the first statement of Delhi's intentions since before the provincial government's decision on export was announced. At that time, Canadian Gulf Oil Co. said it might suspend its multi-million-dollar Pincher Creek development project, but it later stated it would continue proving up those reserves.

Delhi's announcement was interpreted as reflecting confidence in its Trans-Canada pipe-line project—a large-diameter artery which would carry gas from Alberta to the eastern provinces by an all-Canadian route. Gas would come primarily from Pincher Creek reserves.

The continuing activity by Delhi and Gulf indicates these companies are looking for authorization of gas export from southern Alberta next year.

This view is given some backing by Alberta Mines Minister N. E. Tanner's statement this spring that Pincher Creek would see production next year if reserves continue to build up as fast this year as they did in 1951. This could mean only export since there is no market for the gas in Alberta.

Production Can Be Hiked

EDMONTON, Alta.—Alberta's oil industry now could boost production easily to 245,000 bbl. daily, N. E. Tanner, provincial minister of mines and minerals, said recently at the Camrose oil show.

Production under present conservation practices and in keeping with market requirements reached 196,000 bbl. daily during one week in May.

Tanner was at Camrose, about 70 miles southeast of Edmonton, to turn on the valve for the 101st oil well in that district during the town's first oil show.

U. S. Strike Slows Drilling

EDMONTON, Alta.—Immediate effect of the steel strike in the United States on the Alberta oil industry has been to enforce idleness on an estimated 800 drilling-crew members. Drilling contractors said that about 50 rigs are idle. Normally about 230 rigs are busy drilling in Alberta.

Oil-well casing is in short supply as a result of the strike. "The situation is grim," one drilling contractor said. "Production casing has been getting harder to get for the past month, and there doesn't appear to be any chance of a break in the near future. There is some 'black market' casing around, but that isn't helping much."

Oil companies are reluctant to start drilling wells for fear they will be held up by lack of casing.

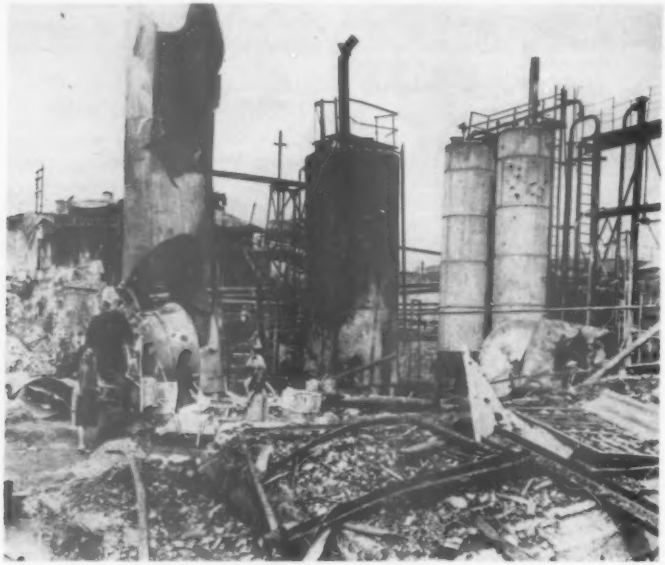
One American company operating in Alberta has placed orders for casing in France, Italy, and Belgium. The company is expecting a shipment from Japan.

Sulfur Plant Operating

JUMPING POUND, Alta.—Shell Oil Co. of Canada last week commenced operation of its 30 ton per day sulfur-recovery plant here.

Employing a modified Claus process, the new plant converts hydrogen sulfide in natural gas to sulfur, which will find a ready outlet in the Pacific Coast pulp and paper industry.

The half-million-dollar installation was designed and erected by Fluor Corp., Ltd.



ONE OF THE REASONS eastern Europe is having difficulty meeting its product requirements lies in plant damage sustained during the last war. This shows the ruins of a treating plant in the Steaua refinery at Ploesti, Romania, following a bombing raid.

Iron-Curtain Report

Poland to remain short of oil, with Russia supplying its deficits; output in Czechoslovakia, Albania is negligible

George G. Rosu

This is the third of four detailed articles outlining conditions in the petroleum industry of the Iron Curtain countries of Europe.

The article here presents an up-to-date account of exploration, production, and refining operations in the three lesser countries, Poland, Czechoslovakia, and Albania.

Operations in Romania, Austria, and Hungary were discussed in the June 2 issue of the Journal.

Appearing next week will be an article presenting a detailed analysis of synthetic-fuel operations in each of the eastern European countries, with information on plant locations, capacities, and the types of processes employed.

POLAND'S importance as a European oil producer was greatly diminished by the incorporation in Russia of Boryslav and Drohobycz, the main East Galician oil center.

Polish crude production dropped from 507,000 tons (10,140 bbl. daily) in 1938 to 126,700 tons (2,530 bbl. daily) in 1947. In 1951, the output rose to 182,750 tons (3,655 bbl. daily) coming from some 2,600 active wells.

Domestic requirements, however, increased from 400,000 tons (8,000 bbl. daily) in 1938, to nearly 650,000 tons (13,000 bbl. daily) last year, owing mainly to the additional needs of the former highly industrialized German territories. Therefore, the Polish oil balance sheet is today in the red by some 470,000 tons (9,400 bbl. daily).

A small fraction of this deficit is made up by domestic synthetic-oil production. But approximately 430,000 tons (8,600 bbl. daily) still had to be imported.

Shortage to continue . . . The Six-Year Plan set a production target of 394,000 tons (7,880 bbl. daily), (originally 304,000 tons) for 1955. However, the domestic requirements for the same year are estimated officially at 1,500,000 tons (30,000 bbl. daily).

If it is conceded that this target will be completely fulfilled and that the production of synthetic oil will increase threefold, Poland still will have to face a deficit amounting to at least half of her domestic consumption.

Under a 4-year trade agreement concluded with eastern Germany, the latter is pledged to supply Poland with oil products until 1955. However, the German supplies are small in comparison with Polish needs. Romania is to send several tens of thousands of tons of products annually. The bulk of the Polish requirements will have to come from Russia, eastern Austria, and the sterling area, in case this will be feasible.

Production outlook . . . The only producing field today is Jaslo. After the loss of the Boryslav-Drohobycz area, the Polish geologists advised against developing the remaining fields because they were too near depletion.

Nevertheless, the government granted substantial sums for reactivating the abandoned or damaged Jasielsk, Krosno, and Gorlice fields. The State Geological Institute started exploring southward of these places. Yet, so far, the expected good results are lacking.

The oil-producing area has been enlarged by the Polish-Russian agreement of February 15, 1951, under which an area of 480 square km. near Ustrzyki Dolne, in the Drohobycz district, has been exchanged for an aqual area in the north, on which runs the main Subcarpathian railroad line binding Lwow-Przemysl-Drohobycz.

Before the war, this corner produced some 8,000-9,000 tons a year of crude (160-180 bbl. daily). The Russians have, allegedly, brought it up to nearly 35,000 tons a year (700 bbl. daily). With this exchange, the Polish oil reserves should have increased from 2,700,000 (20,000,000 bbl.) to about 3,000,000 tons (22,000,000 bbl.)

Although these additional sources are actually nearing exhaustion, the Polish Government is very optimistic.

Equipment problem . . . As in other satellite countries, the lack of materials and adequate field equipment is a difficult problem. Rotary rigs were introduced for the first time in the summer of 1946. The greatest obstacle to rehabilitation of the remaining fields was the renewal of the power units and repair pumps.

Under the 5-year economic agreement of 1948, Russia pledged to supply Poland with some oil equipment. Yet, it was only through the new agreements in December 1950 that Russia

specifically promised the delivery of a few drilling outfits.

In January 1951, the use of Soviet rigs with a drilling depth of 3,000 m. was reported. Last year, the Polish oil industry reportedly used the "turbine drilling," a Soviet down-hole power method.

Refining . . . From the prewar 27 refineries, Poland had, after 1945, only seven with a charging capacity of approximately 400,000 tons a year (8,000 bbl. daily). The installations are obsolete and many of them are patched up with home-made parts.

A great effort is being made to repair and modernize them. But the progress is very slow. In 1949 processed crude amounted to 270,000 tons (5,400 bbl. daily), and to approximately 290,000 tons (5,800 bbl. daily) during the following year. For 1951 a target of 390,000 tons (7,800 bbl. daily) was set and a fulfillment of 106 per cent was claimed.

In September 1951 it was officially announced that a "new refinery of modern type" will soon go on stream in Trzebinia. From the sparse information available, it may be inferred that its charging capacity will be nearly 340,000 tons a year (6,800 bbl. daily) and that it will not start operating before 1953.

Trzebinia, which is bound by pipe line with Jaslo, has already a plant of 85,000 tons a year (1,700 bbl. daily) capacity.

Albania

There are two oil basins in Albania. The northern one is closed in an arch bent eastwards, with its ends in Shkoder and Lezh. The southern basin is centered on the line uniting Elbasan, Kucove, Berat, Selenice and Vlone. South of Berat is the known Selenica bitumen deposit. Some 70 per cent of the crude output comes from Devolli, and the balance from Berat and Shkoder.

Albania's rise to the position of an oil-producing country is due to the scarcity of fuel caused by the economic blockade during the Ethiopian war and World War II and to the subsequent tightening of the Soviet orbit.

Under normal conditions of trade, the Albanian crude deposits do not meet minimum economic requirements. For instance, the production cost of the Albanian crude was twice as high in 1938 as the Gulf quotations.

The gravity of the Devolli crude—the largest deposit in Albania, with a reserve of some 10,000,000 tons (67,000,000 bbl.)—is of nearly 19° A.P.I. gravity, and so rich in asphalt that it is more a bituminous morass.

It yields not more than 12 to 14 per cent gasoline and has a sulfur content of 4 per cent. The residue is very heavy and the coke is unusable. Gravity of the Patos and Drashovica crude is even lower, and their development, though planned, has not yet started.

Crude outlook . . . The Russians took over the Albanian fields soon after this country's breach with Yugoslavia and immediately concluded a long-term agreement for supply of equipment against the whole crude output (on April 10, 1949). But they did not start any particular activity before the summer of 1950, when four additional rigs were moved into the southern region, together with a Russian geological mission and a managing team.

The Two-Year Plan (1949-1950) set a drilling target of 110,000 m. (328,000 ft.). Because of the great scarcity of all kinds of equipment, however, only a small fraction was actually achieved.

Crude output last year rose to approximately 190,000 tons (3,800 bbl. daily). The increase of some 20,000 tons over 1950 was obtained at the price of disproportionate expenses and an increase of 61.3 per cent in manpower employed.

But the Russian administration was dissatisfied with this progress, and its discontent resulted in a change of the minister of fuel in November 1951. Crude output should rise by 1955 to double the 1950 production, or to approximately 340,000 tons (5,800 bbl. daily).

Refining . . . Albania now has three small refineries, one built by the Italians and two more brought in by the Germans during the last part of the war. All three are located at Kocevo.

The small SIMSA plant at Selenica was destroyed during the war. The processing capacity of each amounts to several thousand tons a year. Until 1943, the surplus of crude was sent to Italy for processing. Since 1949, most of it has been sent to Batum, with smaller quantities going to Poland and Czechoslovakia. Currently Albania is being supplied with Romanian oil products.

The Five-Year Plan provides for an oil refinery at Cerrik, southwest of Elbasan, and a bitumen smelting furnace at Selenica. It may be assumed that they will be not completed before 1954 or 1955.

The refinery's charging capacity will be about 150,000 tons a year (3,000 bbl. daily), or less than half of the planned output for that year. By early 1951, voluntary youth brigades had finished the repair of 28 miles of pipe line connecting Kucevo to Vlone, which had been put out of order during the war or damaged afterwards.

Czechoslovakia

Czechoslovakia's importance and problems in eastern Europe are less than those of an oil producer and more those of an oil consumer.

Czechoslovakia and Poland are, from this point of view, the area's greatest liabilities. Whereas before the war Czechoslovakia's domestic consumption averaged approximately 400,000 tons a year (8,000 bbl. daily), in 1951 it rose very close to double this figure.

As a producer, Czechoslovakia takes last place among her East European partners. During the first year of the present Five-Year Plan, crude output equalled peak war production. Recovery was slow, because no great efforts and investments were made to develop domestic production.

On one hand, Czechoslovakia was able to import all the petroleum she needed at international market prices; on the other, there was no great optimism among Czech officials that the Moravian and West Slovakian structures were very promising.

In the last 30 years, these places have been surveyed and drilled many times. During the war, the Germans made great efforts to develop these formations without, however, any encouraging results.

Production plans . . . Under the initial version of the Five-Year Plan, crude output had to be doubled to nearly 100,000 tons (2,000 bbl. daily) by 1953.

The revised target increases crude production by three times as compared with actual output in 1950. This doubles the initial target and provides for approximately 195,000 tons (3,900 bbl. daily) in 1953.

The rate of increase is comparatively modest, and Czech industry produces most of the needed oil equipment. Thus it is quite possible that this target will be reached.

The Geological Institute has been reorganized and its personnel greatly increased. It is reported that drilling activity on the Prevov-Hodonin-Breclav-Matacky line and in the Flysh of eastern Slovakia recently has been intensified. In September 1951, a ministry for fuel and power was created, and the directorates were abolished and replaced by trusts.

This move was apparently precipitated by unsatisfactory results in the oil industry. According to official communiques, oil was lagging behind the target with a 78 to 86 per cent monthly fulfillment.

The Czech refining facilities, which consist of six plants in working condition with a total capacity of nearly 500,000 tons a year (10,000 bbl. daily), have not been subjected to any major change.

Oil Sources Shift

Britain takes double the oil imported before Iran

DESPITE the nationalization and shutdown of the oil properties in Iran, Britain obtained more than twice as much crude oil from the Middle East during the first quarter of this year compared to the first quarter of 1951.

The figures show the extent to which production has been developed in other Middle East countries to replace that lost in Iran. During the first quarter of 1952, the United Kingdom took more than 90 per cent of its total crude imports from the Middle East. During the first 3 months of 1951 it took 85 per cent of the considerably smaller quantity imported.

UNITED KINGDOM CRUDE IMPORTS

(Metric tons)*

Country—	Jan.-Mar. 1951	Jan.-Mar. 1952
Kuwait	1,543,000	3,281,000
Bahrein and Qatar		155,100
Saudi Arabia	247,000	1,409,600
Iran	608,000	
Iraq	135,000	256,000
Total Middle East	2,533,000	5,101,700
Other countries	425,000	500,000
Grand total	2,958,000	5,601,700
Approx. bbl. daily equivalent	244,000	463,000

*Figures from Petroleum Information Bureau in London.

Although crude production lost in Iran has been made up, some deficit continues in refining capacity in the Eastern Hemisphere. Expansion of European refineries is going forward, but the British companies are still lifting more than 80,000 bbl. daily of dollar products from the United States.

E.A.E.G. Meets in London

Nine technical papers on seismic, gravimetric, tellural current, and magnetic methods of oil exploration were presented at the first annual meeting of the European Association of Exploration Geophysicists, held May 22 and 23 in London.

Organization of the new association was begun during the Third World Petroleum Congress held in June of 1951 in The Hague, and its inaugural meeting took place in December. Next meeting is expected to be held in November in Hannover, Germany. The association plans to become affiliated later with the Society of Exploration Geophysicists.

Italian Gas Line Operating

The Cortemaggiore - Turin natural-gas pipe line, another major link in the system of Soc. Nazionale Metanodotti in northern Italy, was officially opened June 1 at Cortemaggiore (Piacenza) by Italy's Prime Minister, Alcide de Gasperi.

Also dedicated at the same time was the new 106,000,000 cu. ft. daily natural-gasoline plant, which was designed and constructed at Cortemaggiore by J. F. Pritchard & Co., Kansas City, Mo.

The new pipe line to Turin is 42 cm. (about 16½ in.) in diameter and is expected to move 3,500,000 cu. m. (about 124,000,000 cu. ft.) daily for industrial use in the city. S.N.A.M., the operating company, is a subsidiary of Azienda Generale Italiana Petroli, the Italian government oil organization.

The natural-gas system in northern Italy is the most extensive in Europe. Total length of lines had increased to about 1,450 miles early this year.

British May Get Tax Relief

The House of Commons of the British Parliament has agreed to a government proposal giving exceptional relief from the excess-profits tax for certain mining, oil, and asbestos companies in cases where the Treasury is satisfied that additional production above the normal was in the national interest.

The solicitor-general, explaining the government proposal, said that the exceess profit could be split into excess attributable to increase in output. The latter, in appropriate cases, would be excluded from the profits of the company as being in anticipation of future profits. The former would be considered as ordinary excess.

MIDDLE EAST

Iran Pleads Case

Premier Mossadegh's speech opens World Court hearing of oil-nationalization dispute; jurisdiction is questioned

Dahl M. Duff

THE Iranian oil-nationalization case was argued on a political basis June 9 before the International Court of Justice at The Hague, the Netherlands, when Iranian Prime Minister Mossadegh made his initial appearance at a court hearing.

Dr. Mossadegh reiterated the now-familiar Iranian charges that Britain and Anglo-Iranian Oil Co., Ltd., carried out a policy of "imperialism" to gain exclusive oil rights. Then, when Iran voted its nationalization law, they responded with "acts of intimidation and threats, sending paratroops to countries on our border and warships to our waters."

He asserted that British agents stirred up industrial, economic, and financial sabotage in Iran, and when this plan failed, the British Government set itself up as a victim before the world court.

Britain filed a complaint before the court last year contending that Iran violated international law by taking over the company's properties. Iran subsequently refused to abide by the court's request that the status quo be maintained pending a final determination of the issue, claiming that the matter was an internal problem over which the court has no jurisdiction.

Jurisdiction is question . . . The court's first task is to rule on whether it has jurisdiction over the dispute. Then the question will be considered on its merits. A decision may not be known for weeks.

The appearance of the 76-year-old Iranian prime minister, himself an experienced lawyer, marked the first time the head of a state has ever presented a case to the court. His remarks to the court were in French and at times were delivered in a state of considerable agitation.

Too little, too late . . . The prime minister said that the company's offer of a new agreement in 1949 was "too little and too late." It is not merely a financial question but a fact that the company has subjected Iranians to "humiliation" and deprived them of access to technical training, he said. He asserted the court has no power or authority to interfere with Iran's dealings with the oil company.

After Dr. Mossadegh's statement, the legal basis for Iran's attack on the court's jurisdiction was outlined by Prof. Henri Rolin, a Belgian attorney representing Iran.

He said the United Nations charter forbids interference in domestic problems, that the court can act only in

situations agreed to by the parties involved, that Iran would show that the British demands are not related to treaties, and that there are still ways in which Anglo-Iranian can be compensated for its properties. The British position in the case briefly is that the concession agreement amounted to a treaty, disputes over which fall within the court's jurisdiction.

New Zubair Crude Line

Plans to lay another pipe line next year to move crude oil from Zubair field in southern Iraq to the tanker terminal at Fao on the Shatt-el-Arab River have been announced in London by Iraq Petroleum Co., Ltd., with which the operating company, Basrah Petroleum Co., Ltd., is associated.

A $2,500,000 order for the pipe has been placed with South Durham Steel & Iron Co.

The present line between the field and the terminal consists of 64 miles of 12-in. and 10 miles of 16-in. This was opened in December, when the field's first commercial production began.

The plans called for a 24-in. parallel line with two more jetties at the tanker terminal. Zubair, discovered in 1948, is rated as one of the most important oil reservoirs in the Middle East.

Poly Equipment Arriving

Equipment is now arriving in the field for the construction of the catalytic polymerization unit at the Ras Tanura refinery of Arabian American Oil Co. in Saudi Arabia.

The unit is scheduled for completion sometime next year. It will add 1,100 bbl. daily of high-octane motor fuel to the refinery's production and increase efficiency of the plant.

The refinery, which had an original design capacity of 50,000 bbl. daily, reached an all-time record in its crude runs in March with a total of 5,491,982 bbl., or 177,148 bbl. daily. The total was 12,446 bbl. above January, the previous record.

The throughput at Ras Tanura of some three and a half times its design capacity has been accomplished without the addition of major new units but with changes to existing equipment such as the installation of extra heater tubes in furnaces and the provision of more pump power.

Present plant equipment consists of two distillation units, vacuum unit, thermal cracking, asphalt manufacture, and treating facilities. It was built during the war on a sandy Persian Gulf peninsula near the site of an earlier prewar 3,000-bbl.-daily skimming unit. During the record high runs in March, the refinery yields included 39.72 per cent bunker fuel, 26.40 per cent diesel, 19.84 per cent gasoline, and 5.63 per cent kerosine.

SOUTH PACIFIC

Refining Contract Let

A group made up of M. W. Kellogg Co. and Costain-John Brown, Ltd., personnel, has been designated as the main contractors for the construction of the new 60,000-bbl. daily refinery which Anglo-Iranian Oil Co., Ltd., is preparing to build at Kwinana near Fremantle, Australia.

More than half the equipment for the installation will be manufactured in the United Kingdom. C. E. Rebbeck, will supervise the work as resident engineer. A. E. Mason has been appointed representative of BP Australia, Ltd., and will handle matters concerning the distribution and marketing of the products.

Plant Talks Under Way

Construction of a 13,000-bbl.-daily refinery in the Philippines is currently under discussion between Caltex and the Philippine Government, and it is hoped that the final decision to proceed with the construction can be made in the near future.

This was announced by Caltex in New York in its first statement on the project. It has been known for more than a year that Caltex was planning a new plant in the republic. It would be the first in the islands.

The company said that the present studies involve refinery expenditures in the range of $30,000,000.

LATIN AMERICA

Brazil Fight Nears Climax

The fight in the Brazilian Congress over President Getulio D. Vargas' proposal to set up a state-oil corporation is nearing a climax.

Reports from Rio de Janeiro are that the congress is holding nightly sessions to discuss the plan. President Vargas asked congressional approval of a multi-million dollar company which would have majority state control and would run the nation's oil industry.

The three groups contesting the issue are the ultra-Nationalists, favoring unrestricted state control; the National Democratic Union, which would permit mixed companies provided they were composed of Brazilians; and the government, which has proposed that the state control 51 per cent of the state enterprise but that outside interests be allowed to participate on a minority basis.

Ironically, the Vargas proposal, which has been denounced in Brazil as too liberal toward foreign oil companies, is considered outside the country too restrictive for any large-scale participation by foreign capital.

International Briefs

A gas discovery at Temixtepec, about 30 miles from Poza Rica field in the State of Vera Cruz, has been announced by Petroleos Mexicanos. Flowing pressure of the gas in 1 Temixtepec was 1,500 psi. Test results were not given, but Antonio J. Bermudez, Pemex director-general, expressed belief the well had penetrated the gas cap of what subsequent wells will prove to be an oil-producing structure.

Costs and sales problems, engineering and financial matters, and employe relations were discussed by marketing executives of Standard-Vacuum Oil Co. at their annual company conference held recently in New York. Participants came from principal countries in Stanvac's territory of operations in Southeast Asia, Africa, and the Far East. Speakers included Joseph E. Pogue, Chase National Bank consultant, who described the process of capital formation in the industry.

The Ministry of Fomento of the Colombian Government has established a tariff equivalent to about $1.08 a barrel for the movement of products through the 87-mile pipe line from the Magdalena River port of Salgar to Bogota. The tariff is for 6 months pending study of the new line's operation.

Work on expanding the capacity of the Leghorn refinery of Stanic Industria Petrolifera, S.p.A., in Italy is scheduled to be completed by mid-1953. The program will raise the plant's working capacity from the current 600,000 tons (about 12,000 bbl. daily) to 1,500,000 tons (about 30,000 bbl. daily). It is anticipated that the enlarged plant will produce about 470,000 tons of motor fuel, 47,000 tons of paraffin, 190,000 tons of gas oil, 500,000 tons of fuel oil, 6,000 tons of lubricants, and 10,000 tons of kerosine annually. The company is jointly owned by Standard Oil Co. (N. J.) and Azienda Nazionale Idrogenazione Combustilibi and has another former hydrogenation plant at Bari.

Heads New Program

Hines placed in charge of railroad's oil activities

WHEN Northern Pacific Railway entered the oil business recently its directors sought the help of LeRoy H. Hines, who at 40 had risen through the ranks to become an executive of Standard Oil Co. of California.

Hines was elected vice president in charge of oil development for Northern Pacific. He had been assistant to the vice president of Standard since July 1951.

Northern Pacific holds oil and gas rights on some 8,000,000 acres of land, about 3,200,000 of which are in the Williston basin area of North Dakota and Montana.

Hines will direct the company's program aimed at encouraging exploration and developing production on these lands.

The company has announced it will permit geophysical and geological work on its holdings and its intention to enter into joint operating agreements covering drilling and development.

Hines got his start in 1929 when he was employed by the oil and gas leasing division of the U. S. Department of Interior in Washington. In 1935 he joined Standard Oil Co. of California. Meanwhile he was graduated from Washington, D. C., School of Law (now American University). In 1944 he was appointed assistant manager of Standard's land department.

W. C. Merritt, of Creole Petroleum Corp., has been named general chairman of the constitution committee of the newly organized Sociedad Venezolana Geofisica (Venezuelan Geophysical Society). The organization is composed of 43 exploration geophysicists in Caracas.

G. D. Craighead, toolpusher for Penrod Drilling Co., has been transferred from Emory, Tex., to New Iberia, La.

Charles R. Halstead, geologist formerly with Geological Logging Co. at Houston, has been appointed geologist for Sinclair Oil & Gas Co. at Tyler, Tex.

J. K. Adams has been named manager of the Houston division of Mid-States Oil Corp. He formerly was with Texas Eastern Production Corp. and Mills Bennett Co.

C. B. Marshall, a director of Standard-Vacuum Oil Co. the past 3 years, has been elected a company vice president. He began his career in India 32 years ago as a marketer and later served as general manager of the company's marketing organization for prewar India. **H. J. Schlereth,** formerly an assistant treasurer, has been elected secretary of the firm.

A. M. Cuellar has been appointed a senior chemical engineer for American Republics Corp. Other company changes include **Stewart Saye,** geologist, transferred from Houston to Lafayette, La., and **Roy Don Loper,** appointed junior geologist at Shreveport, La.

Frank Cullinan has retired as vice president of American Republics Corp. A brother of the late J. S. Cullinan, he had been with the company 34 years.

James B. Townsend, technical supervisor for Imperial Oil, Ltd., has been transferred from Sarnia, Ont., to East St. Paul, Man.

S. F. Smith, formerly with Amerada Petroleum Corp., has been appointed geologist for Union Sulphur & Oil Corp.

John Olvey, Shreveport, La., a past president of Independent Petroleum Producers Association, has been named chairman of the new Louisiana State Mineral Board.

E. R. Filley, general manager of The Texas Co. producing department, has been awarded a doctor of laws degree by Baker University, Baldwin, Kans.

Norman M. Tobison, geologist for The Texas Co. at Midland, has resigned to become a consulting geologist at Dickinson, N. D.

A. R. Denison, vice president of Amerada Petroleum Corp. in charge of exploration, has been awarded an honorary degree of doctor of science by the South Dakota School of Mines, Rapid City, S. D. Denison delivered the commencement address at the school June 6.

Albert P. Haws, toolpusher for Penrod Drilling Co., has been transferred from Big Spring to Dalhart, Tex.

P. E. DUFENDACH

Paul E. Dufendach has been appointed assistant to the chief engineer of Texas Gas Transmission Corp. He will aid **Chief Engineer H. L. Stowers** with engineering matters before the Federal Power Commission. A veteran of 20 years in the natural-gas business, he formerly was employed by Louisville Gas & Electric Co. and Kentucky-West Virginia Gas Co.

Eugene L. Davis has joined National Petroleum Corp., Ltd., as projects manager at Calgary, Alta. For the past 3 years he has been projects manager for Arctic Contractors, Inc., at Fairbanks, Alaska. Prior to that he was production superintendent for Signal Oil & Gas Co. in California.

Donald F. Notley, Sinclair Oil & Gas Co., Seminole, Okla., is the new president of the Shawnee Geological Society. Other officers are **James D. Kersey,** The Texas Co., Shawnee, and **Charles H. Glidden,** Atlantic Refining Co., Shawnee.

W. D. Green, a superintendent in the Husky Oil & Gas Co. refinery at Lloydminster, Alta., has been elected councillor of the town of Lloydminster.

Harry P. Hohenadel, Bartlesville, Okla., has been named head of the economics and planning department of Cities Service Oil Co. He will be assisted by **Dwight Williams.** Hohenadel formerly served as general superintendent of the company's chemical division.

PERSONALS

R. F. Brown has been appointed general manager of the general development department of Spencer Chemical Co. in Kansas City. Other assignments recently announced by the company include: **Frank L. Pyle,** Vicksburg, Miss., works manager; **J. C. Denton,** general manager of industrial services at Pittsburg, Kans.; **Neil S. Whitaker,** acting works manager, Charlestown, Ind.; **Max W. Foresman,** director of public relations, Kansas City; **Byron M. Kern,** Vicksburg, production superintendent; **W. A. Johnston,** Henderson, Ky., works manager; **R. J. Tiller,** Henderson works engineer.

Francis Sessums, assistant district engineer of the U. S. Geological Survey at Bismarck, N. D., has been named engineer in charge at Fort Worth. He will be succeeded at Bismarck by **Roy Monroe,** formerly in the Honolulu office.

A. W. McMurray, Hominy, Okla., driller and producer, has been appointed production superintendent for Russell Cobb, Jr., and associates. He will devote most of his time to activities in Osage County, Oklahoma, and Cowley County, Kansas.

Myron Vance, geologist for Gulf Oil Corp., has been transferred from Oklahoma City to Durango, Colo.

Charles J. Hedlund, chief petroleum economist for Standard Oil Co. (N. J.), has been named director of the program division of the Petroleum Administration for Defense. Hedlund, a consultant to the administration since March, succeeds **Cecil L. Burrill,** who is returning to Creole Petroleum Corp. in New York.

L. E. Achterberg has been appointed superintendent of the right-of-way and claims division in the products pipeline department of Standard Oil Co. (Ind.). Other company changes include: **Dan Smith,** promoted to assistant general foreman in the light-oils division, pressure-still department; **J. A. Norgaard,** promoted to general foreman in the mechanical division; **J. H. Byrd,** promoted to zone adviser in the mechanical division; **J. G. Housman,** promoted to head service engineer in the engineering division; **R. L. Green,** appointed assistant head service engineer; **K. C. Lowe,** named head construction engineer; **B. E. Brown,** named assistant head construction engineer; **J. W. Hammersmith,** appointed assistant head construction engineer in charge of field engineers; **C. B. Parrish,** promoted to assistant head engineer; and **L. A. White,** appointed assistant head inspection engineer.

Gas Measurement

Eight prominent participants in the Southwestern Gas Measurement Short Course, held annually at Norman, Okla., were these committee heads. Left to right, seated, are T. S. Whitis, West Texas Gas Co., program committee; W. H. Carson, University of Oklahoma, local arrangements; Miss Kate A. Niblack, Oklahoma Utilities Association, registration and publicity; and James L. Griffin, Northern Natural Gas Co., general chairman. Standing are K. R. Tibbets, Warren Petroleum Corp., publications committee; W. A. Griffin, Daniel Orifice Fitting Co., exhibitors advisory subcommittee; R. O. Cox, Lone Star Gas Co., committee for study of practical methods; and Roy S. Peace, Jr., Southern Natural Gas Co., exhibits. A total of 1,304 were registered, representing 34 states and two foreign countries. Eighty classes on subjects related to gas measurement and regulation were conducted.

W. J. Lang has resigned from Tokian Royalty Corp. to become area geologist for Gulf Oil Corp. at Ardmore, Okla.

W. E. Buck, district engineer for Shell Oil Co., has been transferred from Oklahoma City to Tulsa.

O. C. Arnold, assistant production superintendent for Amerada Petroleum Corp., has been transferred to Williston, N. D., to oversee development in the Williston basin.

Dr. G. M. Lees, chief geologist of Anglo-Iranian Oil Co., Ltd., has been elected president of the Geological Society of London for a second year.

Lawrence E. Loeffler, recent graduate of the University of Pittsburgh, has joined the engineering department of Arabian American Oil Co. in the New York office. Other new Aramco employes in New York are **Lawrence P. Quinn,** Manhattan College, in Aramco's engineering department; and **Veronica McGarry,** University of Tennessee, in producing, pipe lines, and transport.

John Lynch, president of La Gloria Corp. at Corpus Christi, Tex., has been named a director of the Lower Nueces River Water Supply District.

Richard F. Lemon, a petroleum engineer for Stanolind Oil & Gas Co., has been transferred from Midland to Lubbock, Tex.

Clarence S. Beesemyer, executive vice president of General Petroleum Corp. since 1948, will retire, effective January 1, 1953. He will continue to act as an advisor to company departments in advertising and sales promotion.

H. L. Pelzer, formerly manager for Sinclair Research Laboratories, Inc., at Harvey, Ill., has been named vice president of the company with offices in Tulsa.

R. C. Hart has been appointed production foreman for General Petroleum Corp. in the Taft, Calif., district. **J. E. Presho** has been named production foreman in Lost Hills field.

C. Homer McDuff has been named to replace **Raymond B. Hamilton** as manager of the Shreveport district office of the Louisiana Department of Conservation's Minerals Division. Mc-

PERSONALS

Duff formerly worked for Texas Co., Pure Oil Co., Standard Oil Co. of Venezuela, and Southern Production Co.

Reynolds Girdler has been appointed director of public relations and advertising for Sinclair Oil Corp. and affiliated companies.

James J. Cosgrove, chairman of the board of Continental Oil Co. and a founding member of the American Petroleum Industries Committee, received an engrossed resolution at the A.P.I.C.'s June meeting for his 19 years of service on the committee. He was appointed general counsel for Continental in 1929, elected a vice president in 1944 and became board chairman a year later.

R. D. Townsend has been appointed assistant to the manager of Rocky Mountain operations for General Petroleum Corp. at Casper, Wyo.

Leland E. Wilson, drilling engineer for Atlantic Refining Co., has been transferred from Corpus Christi, Tex., to Magnolia, Ark.

G. B. Lowther, formerly a construction engineer for Mississippi River Fuel Corp. at Shreveport, has been appointed assistant chief engineer at St. Louis.

Harold W. Haight, executive vice president and director of Creole Petroleum Corp., was awarded a distinguished achievement medal by Colorado School of Mines at the school's commencement exercises. He was graduated from the school in 1927 with a degree in geological engineering.

R. W. Mallory has resigned as geophysical coordinator in the Rocky Mountain division of Stanolind Oil & Gas Co. to establish a district office in Casper, Wyo., for Chicago Corp.

Fred M. Carroll, Midland, has been named assistant area crude-oil buyer for Ashland Oil & Refining Co. in the West Texas and New Mexico district.

Frederick H. MacLaren, Munster, Ind., group leader in charge of research on waxes and asphalts in the research department of Standard Oil Co. (Ind.), has been awarded a professional degree in chemical engineering by Ohio State University.

E. M. Townsend has been appointed head of the inspection service and development section of the Esso Standard Oil Co. refinery at Bayway, N. J. Two new group heads in his section are **V. P. Bracken,** special studies, and **J. H. Priestly,** miscellaneous.

Bob Schreiner, of the geological department of Aladdin Petroleum Corp., will become a representative for **Joe Clair** and **Joe Dyer,** Denver, in their Oklahoma City consulting office July 1.

Edmund A. J. Mroz, chemical engineer in the Badger process division of Stone & Webster Engineering Corp., Boston, has been assigned temporarily to the Lake Charles, La., refinery of Continental Oil Co.

James L. Minahan, Sr., formerly with the U. S. Geological Survey at Thermopolis, Wyo.; **Gordon B. Butterfield,** Phillips, Mont., and **Adler Edmiston,** Houston, have formed Wymotex Oil Co. and will open offices in Billings.

James W. Gibson, formerly engineer for The California Co. at Denver, has joined J. Ray McDermott Co., Denver. **C. W. Hula,** formerly with Huber Corp., has been appointed geologist for McDermott.

J. A. Carroll, Jr., has been elected financial vice president of Pan American Petroleum & Transport Co. and subsidiary companies. He will continue to serve as a member of the board of directors. Other new officers are **W. M. Scott,** comptroller, and **R. A. Arzinger,** treasurer. All are located in New York.

J. M. Kilborn, party manager for Gulf Research & Development Co., has been transferred from Big Lake to San Angelo, Tex.

J. T. Gilliam, seismograph party chief for Amerada Petroleum Corp., has been transferred from Grande Prairie, Alta., to Plentywood, Mont.

DEATHS

Howard S. King, 78, a Long Beach, Calif., oil investor, died June 3 at his home there. He was one of the early developers of Santa Fe Springs oil field.

John T. Boyle, 84, pioneer Taxas oil man, died at his home in Houston June 5.

John J. Sheerin, 58, died June 7 in San Antonio. He helped establish La Gloria Corp., Corpus Christi Corp., and Shamrock Oil & Gas Co., of which he was president until 1938. He also was associated with **J. L. Lucey,** Dallas, in Empire Oil & Gas Co.

Sam Harkey, Holdenville, Okla., driller, was killed in a rig accident near Konawa, Okla., June 6. He was employed by Davis Drilling Co.

Arthur Moffett, 83, retired lease operator, died in Tulsa June 8.

Carl M. Rabun, Sr., 53, assistant superintendent of the Standard Oil Terminal at Sanford, Fla., died there June 3.

Jim Renshaw, 62, who established and operated the Renshaw Oil Co., died June 6 in Hobart, Okla.

Arthur L. Harding, formerly chief electrical engineer for Ebasco Services, Inc., died recently near Casablanca of a heart ailment. His death interrupted a tour of Africa and Europe. He retired from Ebasco in 1946.

Neal (Red) Ammons, 53, owner of Ammons Drilling Co., died June 2 at his home in Bakersfield, Calif.

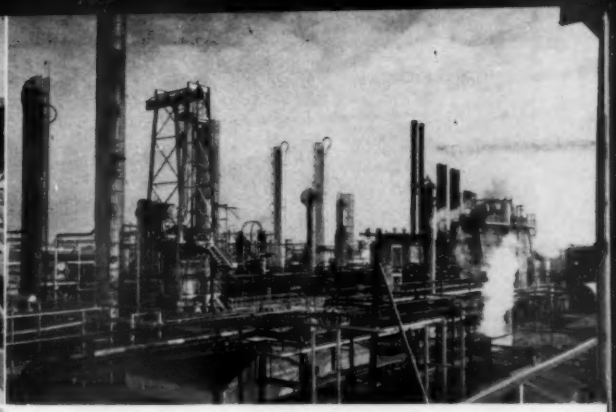
In This Issue . . .

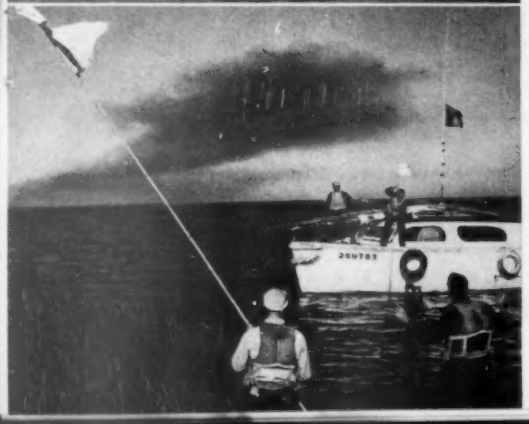
. . . Another Journal Insert Map

Don't miss the special insert in this issue—a detailed map of the Gulf Coast showing location of oil fields, gas fields, salt domes, and refineries.

The map also contains an insert outlining the Gulf Coast's oil basins and another showing pipe-line movement of Gulf Coast oil.

Also with the map is a listing of all refineries and cycling plants in the Gulf Coast area, with key letters and numbers referring to their location on the map.





The

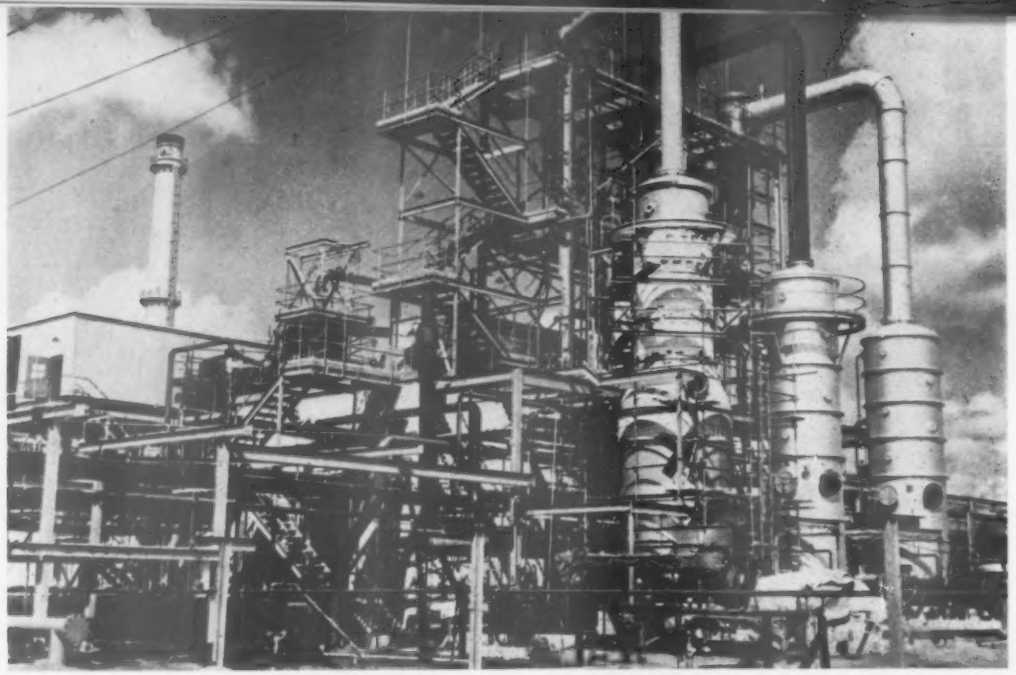
Gulf Coast

. . . TODAY

A Special Section . . .

. . . presenting new facts on this vital oil region. Reports and articles cover:

- **petrochemicals**
- **refining**
- **gas transmission**
- **exploration**
- **production**
- **drilling**
- **pipe lines**



DU PONT COMPANY'S Victoria plant converts butadiene to an intermediate chemical for Nylon production. Other Du Pont petrochem plants in Gulf Coast are located at Orange and La Porte, Tex.

The Gulf Coast *TODAY . . .*

. . . Its Billion-Dollar Petrochemicals Industry Geared for War or Peace

F. Lawrence Resen

ALMOST half a billion dollars has been earmarked for petrochemical industry along the Gulf Coast. These projects have been completed or in process of construction during the past 12 months.

Already concentrated in four major areas (Houston, Port Arthur-Port Neches, Texas City-Freeport, and Lake Charles, La.), the petrochemical industry has likewise centered its present growth in those same regions. In the Houston locality, $122,900,000 is the expansion program total; Texas City-Freeport area follows with $122,100,000, and Lake Charles and the Port Arthur-Port Neches areas have in excess of $27,000,000 each tied up in expansion programs.

Texas City . . . In Texas City, Pan American Refining Co. has a $1,100,000 program for increasing the capacity of its benzene and toluene facilities. Close at hand, Monsanto Chemical Co. has new facilities under way costing in excess of $41,000,000. These will be used to increase the production of styrene and vinyl chloride and provide for new production facilities for the preparation of acrylonitrile.

Also at Texas City, Carbide & Carbon Chemicals Division has a $60,285,000 expansion program moving along which includes facilities for the production of polyethylene plastic resin from ethylene and the expansion of acetylene production. The acetylene is produced by the high-temperature reaction of methane and oxygen.

Carbide has announced another $73,663,000 expansion to take place somewhere in Texas, presumably along the Gulf Coast, but not at Texas City.

Dow Chemical Co. at Freeport has expansion under way at its two plants for increasing petrochemical facilities. A $5,600,000 ethylene expansion and a $1,610,000 styrene expansion program were completed late this spring along with ethylene glycol and vinyl chloride facilities. A $4,316,000 ammonia-plant expansion program is also under way.

Ethyl-Dow Chemical Co., also at Freeport, has an $8,185,000 expansion

Editor's Note: This 20-page section introduces The Oil and Gas Journal's traditional Gulf Coast Number, scheduled annually at this time of year. This introductory section, prepared after several months' research by the Journal's Houston editorial staff (Walter Rose, F. Lawrence Resen, W. Van London, L. D. Owen), gives a comprehensive over-all picture of: The Gulf Coast Today! . . . This is one of the world's greatest oil and gas centers.

program progressing which will provide additional capacity for the production of ethylene dibromide.

Houston . . . Shell Chemical Corp. stepped up its synthetic glycerin output by 50 per cent and its ethyl chloride output by 30 per cent in new facilities placed into production at the beginning of 1952. Total outlay for the expansion was $15,500,000. A corresponding increase was required in the production of ethylene to satisfy the ethyl chloride demands. A $500,000 sulfur-recovery unit for the chemical plant is due to be on stream shortly and is designed to recover in excess of 13,000 tons of sulfur annually from waste refinery gases.

Ethyl Corp. increased its capacity for producing tetraethyl lead by 50 per cent with the opening of a $45,000,000 plant in Houston this spring. In addition, a $4,000,000 program is under way at main Baton Rouge plant.

Phillips Chemical Co. has two large projects under way at its Houston plant. The first is a $38,260,000 plant for the production of 450 short tons of ammonia daily. Necessary hydrogen will be obtained from natural gas. A second project is a $3,500,000 installation for pyridines.

A $12,000,000 plant will be constructed in Houston by Heyden Chemical Corp. for production of methanol. Rohm & Haas, also at Houston, is spending $4,000,000 in an expansion program for acetone cyanhydrin.

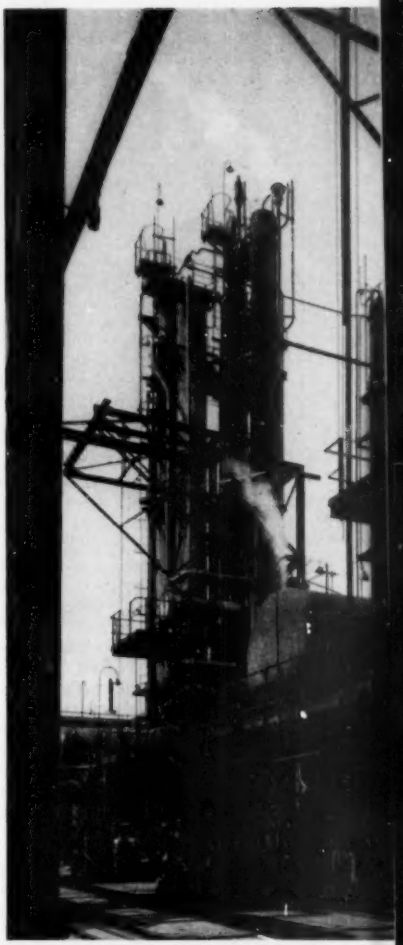
Eastern States Petroleum Co., Inc., announced the formation of Eastern States Chemical Co. which will handle the petrochemical operations of the parent company. Eastern States is now producing benzene from its Udex unit, the first aromatics unit of its type to be built, and will also produce other petrochemicals from its two refineries located on the Houston Ship Channel.

Humble Oil & Refining Co. announced plans for the construction of a paraxylene plant which will begin this fall. The petrochemical plant will be located at the Baytown refinery of Humble and its production will be used in the synthesis of Dacron.

The Baytown plant will be used to obtain substantially pure paraxylene from a crude mixture containing ortho, meta, and paraxylenes, ethyl benzene.

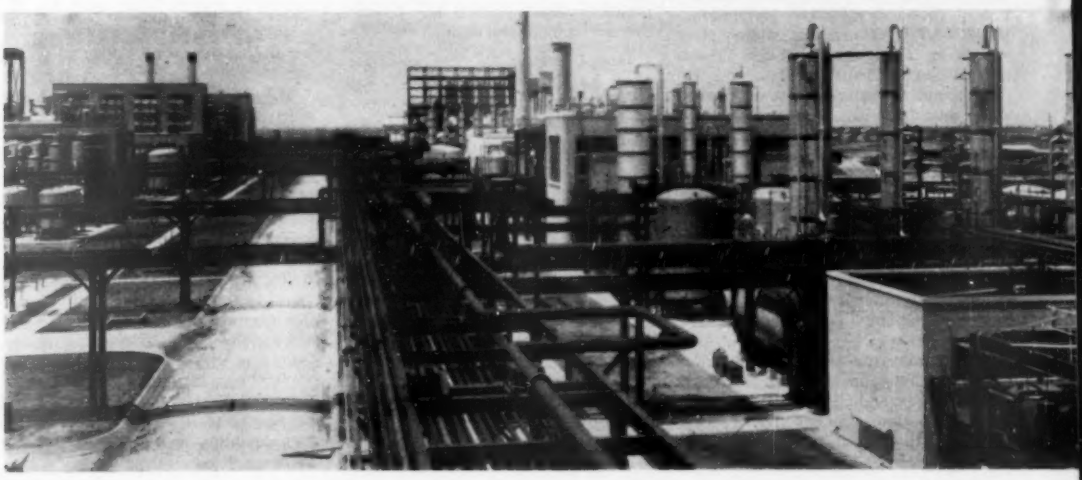
Diamond Alkali will build a $2,000,000 petrochemical plant to produce vinyl chloride and perchloroethylene from petroleum feed stocks. The new plant will be built adjacent to the Deer Park installations of the company. In addition, a $1,600,000 anhydrous ammonia expansion program has been completed by Diamond.

Port Arthur . . . Initial installations for the production of ethylene and isooctyl alcohol is scheduled for this year by Gulf Oil Corp. which is building two plants at Port Arthur. The $15,427,000 ethylene plant will produce 180 million pounds annually and will utilize byproduct refinery gases. The isooctyl plant will cost $700,000 and will produce 9 million pounds of the



CARBIDE & CARBON CHEMICAL CO.'S Texas City petrochem plant (below) synthesizes ethylene oxide, ethylene glycol, acetic acid, acetic anhydride, and ethanol as major products.

COMMERCIAL SOLVENTS CORP. has a major expansion program under way at Sterlington, La., petrochem plant, right. Ammonia and methanol production will be boosted appreciably when the project is completed.



alcohol annually. In addition, Gulf is building a $2,300,000 sulfuric acid plant at Port Arthur and a $580,000 sulfur-extraction plant, also at the refinery.

A $4,500,000 ethyl benzene plant is being constructed by the Koppers Co. in Port Arthur. This plant will receive ethylene from Gulf's pipe line which carries this material over a 138-mile network to various Texas petrochemical plants.

Port Neches . . . Jefferson Chemical Co., jointly owned by The Texas Co. and American Cyanamid Co., placed a new unit for the production of monoethanolamine, diethanolamine, and triethanolamine into operation at Port Neches. A second new unit under construction for the production of nonyl phenol and dinonyl phenol is due on stream this month. Additional plant expansion is presently in design stages for completion in mid-1953.

Neches Butane Products Co., Port Neches, is in the midst of a $5,000,000 expansion program which will boost its production of butadiene-1,3, a raw material for synthetic rubber, from 180,000 to 200,000 short tons per year.

A newcomer to the petrochemical industry, the Solvay Process Division of Allied Chemical & Dye Corp., announced the construction of a $5,000,000 plant at Orange which will use ethylene and natural gas at its principal raw materials. Solvay will produce ethylene oxide and ethylene glycol at the facilities when they are completed in 1953.

Lake Charles . . . American Petrochemical Corp., jointly owned by Cities Service Oil Co. (Del.) and Firestone Tire & Rubber Co., will construct a $20,000,000 plant at Lake Charles for production of antifreeze and plastics.

A $7,750,000 cracking catalyst plant is being constructed at Lake Charles by Davison Chemical Corp., and will be completed early next year. Enough synthetic fluid petroleum cracking catalyst will be produced for processing 600,000 bbl. petroleum stocks daily.

In Sterlington, La., Commercial Solvents Corp. has a major expansion under way for the expansion of ammonia and methanol facilities. The $16,450,000 program is due for completion in mid-1953. In addition, a $4,087,000 ammonium nitrate plant, due to be in production in 1953, will be constructed.

Esso Standard Oil Co.'s Chemical Products Division at Baton Rouge is currently expanding ethyl alcohol and isooctyl alcohol facilities and adding a unit for the manufacture of benzene. The program will cost $3,000,000.

PETROCHEMICAL PROJECTS ALONG THE GULF COAST COMPLETED, UNDER WAY OR ANNOUNCED DURING PAST 12 MONTHS

Company—	Cost	Product
American Cyanamid Co.	$50,000,000	Ammonia, acetylene, and hydrocyanic acid
American Petrochemical Corp., Lake Charles, La.	20,000,000	Ethyl glycol, plastics
Carbide & Carbon Chemicals Div., Texas City, Tex.	63,300,000	Polyethylene plastic, acetylene, others
Carbide & Carbon Chemicals Div., Texas location	73,700,000	Not revealed
Celanese Corp., Bishop, Tex.	3,500,000	Formaldehyde
Commercial Solvents Corp., Sterlington, La.	20,500,000	Methanol, ammonia
Diamond Alkali Co., Houston	3,600,000	Ammonia, vinyl chloride, perchloroethylene
Davison Chemical Corp., Lake Charles, La.	7,800,000	Cracking catalyst
Dow Chemical Co., Freeport, Tex.	11,500,000	Ethylene, styrene, ammonia, ethylene glycol
E. I. du Pont de Nemours & Co.	(*)	Nylon intermediates
Esso Standard Oil Co., Baton Rouge	3,000,000	Ethyl alcohol, isooctyl alcohol, benzene
Ethyl Corp., Houston	45,000,000	TEL facilities
Ethyl Corp., Baton Rouge	4,000,000	TEL expansion
Ethyl-Dow Chemical Co., Freeport, Tex.	8,200,000	Ethylene dibromide
B. F. Goodrich Chemical Co., Port Neches	5,400,000	Rubber
Goodyear Synthetic Rubber Co., Houston	500,000	Rubber
Gulf Oil Corp., Port Arthur	19,000,000	Ethylene, isooctyl alcohol, sulfuric acid
Heyden Chemical Co., Houston	12,000,000	Methanol
Humble Oil & Refining Co., Baytown	(*)	Paraxylene
Jefferson Chemical Co., Port Neches	1,000,000	Ethanolamines
Koppers Co., Port Arthur	4,500,000	Ethylbenzene
Lion Chemical Co., New Orleans	31,000,000	Ammonia
Monsanto Chemical Co., Texas City	41,000,000	Styrene, acrylonitrile, vinyl chloride
Neches Butane Co., Port Neches	5,000,000	Butadiene
Pan American Refining Co., Texas City	1,100,000	Benzene, toluene
Phillips Chemical Co., Houston	41,800,000	Ammonia, pyridines
Rohm & Haas Co., Houston	4,000,000	Acetone cyanhydrin
Shell Chemical Co., Houston	16,000,000	Glycerin, vinyl chloride, ethyl chloride, sulfur
Solvay Process Division, Orange, Tex.	5,000,000	Ethylene oxide-ethylene glycol
U. S. Rubber Co., Port Neches	2,500,000	Rubber
U. S. Rubber Co., Baton Rouge	1,500,000	Rubber
Total	$452,400,000	

*Not disclosed.

American Cyanamid Co. plans to build a $50,000,000 chemical plant near New Orleans, La. The plant will produce ammonia, acetylene, hydrocyanic acid, and derivatives of these products. Among these are acrylonitrile and ammonium sulfate.

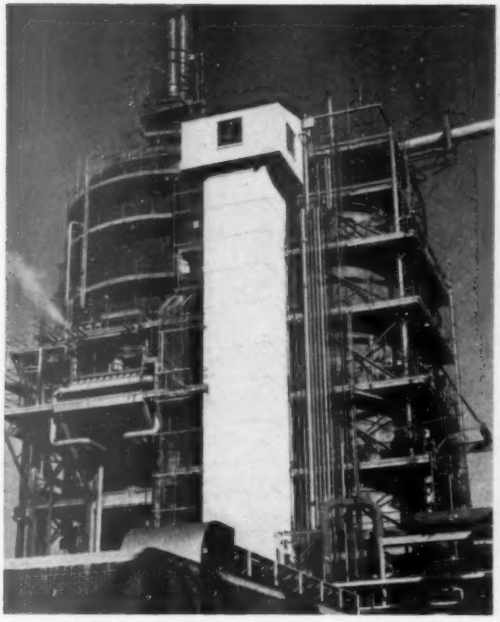
Lion Chemical Co. has announced plans for the construction of a $31,000,000 plant for the production of anhydrous ammonia at Luling, La., near New Orleans. The new plant will use natural gas as fuel and raw material and will produce 300 tons of ammonia, part of which will be converted into ammonium nitrate.

Du Pont Co. has just completed an expansion program at its Victoria plant, where butadiene and natural gas are used as raw materials in the production of adiponitrile, an intermediate chemical used in the production of nylon. The company also has obtained a 562-acre site in the Beaumont area.

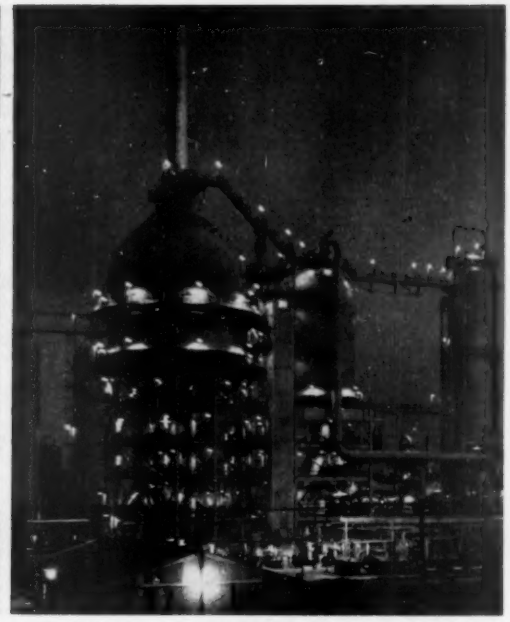
Pan-Am Southern Corp. announced its entrance into the petrochemical field by the construction of a polybutene unit at its El Dorado, Ark., refinery. The unit will produce 2,000,000 gal. annually of the polymer used in lube-oil additives. Pan-Am also converted a polymerization unit to the production of propylene tetramer used in the manufacture of synthetic detergents. An annual output of 3,400,000 gal. of tetramer will be realized.

Celanese Corp. of America has erected a trioxane paraformaldehyde unit at its Bishop, Tex., petrochemical plant costing $3,485,000. At Bishop, Celanese processes butane and propane to produce a wide variety of organic chemicals, including alcohols, glycols.

Synthetic rubber facilities also were expanded during the past year. U. S. Rubber Co. has a $2,500,000 program under way at Port Neches. B. F. Goodrich Co., also of Port Neches, has initiated a $5,350,000 expansion program. Goodyear Synthetic Rubber Co. spent $500,000 in increasing capacity at its Houston plant. Nagautuck Chemical Division of U. S. Rubber has a $1,500,000 expansion program under way at its Baton Rouge rubber plant.



SHELL OIL CO.'S cat cracker in its refinery near Houston. This unit was the first large-scale operation designed to use micro-spheroid catalyst.



GULF OIL CORP.'S new 63,000-bbl. per day cat cracker recently placed in operation at its Port Arthur refinery is the world's largest of its kind.

The Gulf Coast *TODAY*. . .

. . . Its Refining Capacity Nearly A Third of Nation's Total

F. Lawrence Resen

THE Gulf Coast—a major refining belt of the United States, with a daily capacity in excess of 2,290,000 bbl. representing more than 31 per cent of the nation's total refining capacity—has been experiencing the growing pains of an enormous expansion program, accelerated by high defense and civilian demands for petroleum products.

Projects range in size from relatively small additions of less than a million dollars up to Esso Standard Oil Co.'s $51,000,000 program under way at Baton Rouge. In all, more than $267,500,000 has been earmarked for current projects including those completed in the last 12 months. The trend is a continuing one, with new expansion programs being announced from time to time.

The vigorous expansion which is taking place is spread throughout the Gulf Coast area. Construction crews are at work in Houston, Corpus Christi, Baton Rouge, Port Arthur, Lake Charles, New Orleans, Texas City, and other areas. They are clearing ground and erecting the structures required in the multi-million-dollar program.

The expansion program has not been one of smooth sailing. Refiners in general have been plagued by the shortage of critical materials, and the programs have had a tendency to lag behind schedule. However, although completion dates of individual projects have been slowed, over-all expansion has suffered little and is progressing rapidly.

Port Arthur . . . In the Port Arthur-Beaumont area, where six refineries having a combined capacity of 770,000 bbl. are located, Gulf Oil Corp.'s 245,000-bbl. refinery placed the world's largest catalytic cracking unit on stream in the fall. The 63,000-bbl. fluid unit was constructed by M. W. Kellogg Co. at a cost in excess of $18,000,000. Gulf is also adding a 60-ton unit for the recovery of sulfur from refinery gases as well as a 300-bbl. sludge decomposition acid unit.

An expansion program is under way at Pure Oil Co.'s 55,000-bbl. Smith Bluff refinery near Port Arthur which will cost $11,100,000. New facilities include a fluid catalytic cracker, a catalytic polymerization unit, and a tube still. In addition, substantial enlargement of alkylation facilities is planned.

In Beaumont, Magnolia Petroleum Co. completed conversion of its catalytic cracking setup with the addition of a third air-lift T.C.C. unit to join two others constructed earlier in the year. The addition of a new feed-preparation unit is being made at the present time. Magnolia also unveiled its new wax-molding machine to the industry during the summer months. The novel idea of making wax cakes was an adaptation of a candy-making machine.

Magnolia has received certification from DPA for a $11,000,000 installation. This is to be used for production of high-octane gasoline.

The Texas Co. is increasing its crude-distillation capacity and steam-generating unit at its 200,000-bbl. plant in Port Arthur. In expanding its refining facilities last year, Texaco spent over $19,000,000. Although no figure has

been revealed, a similar amount is expected to be allocated for current expansion.

Corpus Christi . . . A new 25,000-bbl. refinery is being constructed at Corpus Christi by Sunray Oil Corp. Completion of the $16,000,000 installation, expected in late 1953, will add a sixth refinery to the South Texas bay area. The refinery will be a completely balanced plant, although initial production is expected to be primarily intended for aviation gasoline. A U.O.P. fluid catalytic cracking unit and a Lummus crude-distillation unit and treating plant will be part of the installations in the new refinery.

Pontiac Refining Co. has completed a general expansion program costing $2,900,000 at its Corpus Christi plant, with most of the increase taking place in aviation-gasoline facilities. Close by, Taylor Refining Co. is installing a Platforming unit, and other facilities have been expanded as part of a $3,750,000 program.

Texas City . . . In Texas City, Republic Oil Refining Co. has a $7,000,000 general plant-expansion program under way which is due for completion in 1953. Among units to be installed will be a U.O.P. Platformer.

Close by, Pan American Refining Co. is increasing plant crude capacity by 12,000 bbl. in its 130,000-bbl. plant. The $19,600,000 expansion program calls for the inclusion of a new 30,000-bbl. fluid catalytic cracking unit.

Sid Richardson Refining Co. has completed a modernization program at its 20,000-bbl. per day plant, also located in Texas City.

TABLE 1—MAJOR REFINERY CONSTRUCTION PROJECTS ALONG GULF COAST COMPLETED, ANNOUNCED, OR UNDER WAY IN PAST 12 MONTHS

Company—	Cost	Project
Cities Service Ref. Corp., Lake Charles, La.	$26,600,000	Fluid Hydroformer, general facilities
Continental Oil Co., Lake Charles, La.	24,000,000	Cat crackers, Platformer, aromatics extraction unit, crude unit
Eastern States Pet. Co., Houston, Tex.	3,300,000	Platformer, Udex unit, alkylation expansion
Esso Standard Oil Co., Baton Rouge, La.	51,000,000	Expand distillation and cracking facilities and gas processing equipment
Fulton & Olmstead, San Antonio, Tex.	10,000,000	Aviation-gasoline plant
Gulf Oil Corp., Port Arthur, Tex.	21,400,000	Cat cracker, sulfuric acid plant
Magnolia Pet. Co., Beaumont, Tex.	11,000,000	Aviation-gasoline plant
Pan American Ref. Co., Texas City, Tex.	19,600,000	Cat cracker, general expansion
Pan-Am Southern Corp.	5,500,000	Cat cracker, alkylation unit, fluid Hydroformer
Phillips Pet. Co., Sweeny, Tex.	27,000,000	Crude unit, expand alkylation unit, general expansion
Pure Oil Co., Port Arthur, Tex.	11,100,000	Cat cracker, general expansion
Pontiac Ref. Co., Corpus Christi, Tex.	2,900,000	General facilities
Republic Oil Ref. Co., Texas City, Tex.	7,000,000	Platformer, general expansion
Shell Oil Co., Houston, Tex.	10,400,000	Aromatics extraction
Shell Oil Co., Norco, La.	30,000,000	General expansion
Sinclair Ref. Co., Houston, Tex.	28,000,000	Cat cracker, crude unit
Sunray Oil Corp., Corpus Christi, Tex.	16,000,000	Complete refinery
Taylor Ref. Co., Corpus Christi, Tex.	3,700,000	Cracking facilities, Platformer
Total	$278,500,000	

Phillips Petroleum Co., at Sweeny, Tex., meanwhile is winding up a $27,000,000 expansion program which included the addition of a new 30,000-bbl. per day crude-distillation unit, rehabilitation and expansion of hydrofluoric acid alkylation unit, conversion of thermal reformer, and modification of the catalytic cracking unit.

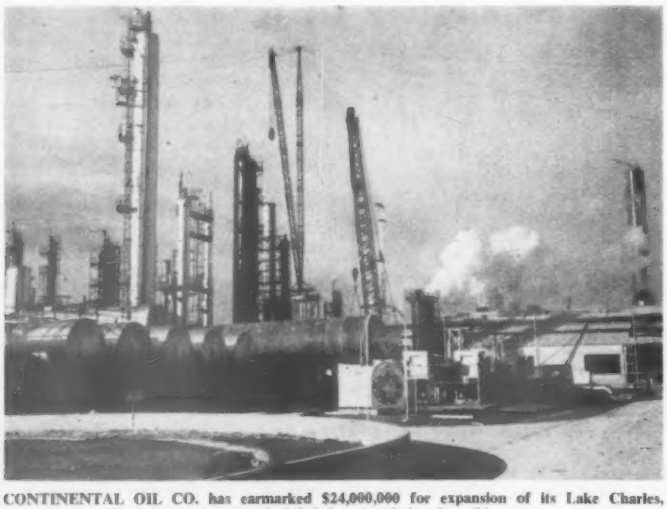
Baton Rouge . . . Largest expansion program announced for the Gulf Coast refiners was the $51,000,000 earmarked by Esso Standard Oil Co. for a 2-year growth of its Baton Rouge refinery. When completed, the plant will have had its crude-oil charge capacity increased from 240,000 to 270,000 bbl. per day. The construction will include new distillation equipment, expansion of fluid catalytic cracking facilities, and additional equipment for processing petroleum gases.

Houston . . . Sinclair Refining Co. is spending $28,000,000 in its Houston refinery to expand crude-oil capacity from 85,000 to 110,000 bbl. per day. Construction of new facilities will include a 35,000-bbl. crude-distillation unit and a 50,000-bbl. fluid catalytic cracking unit.

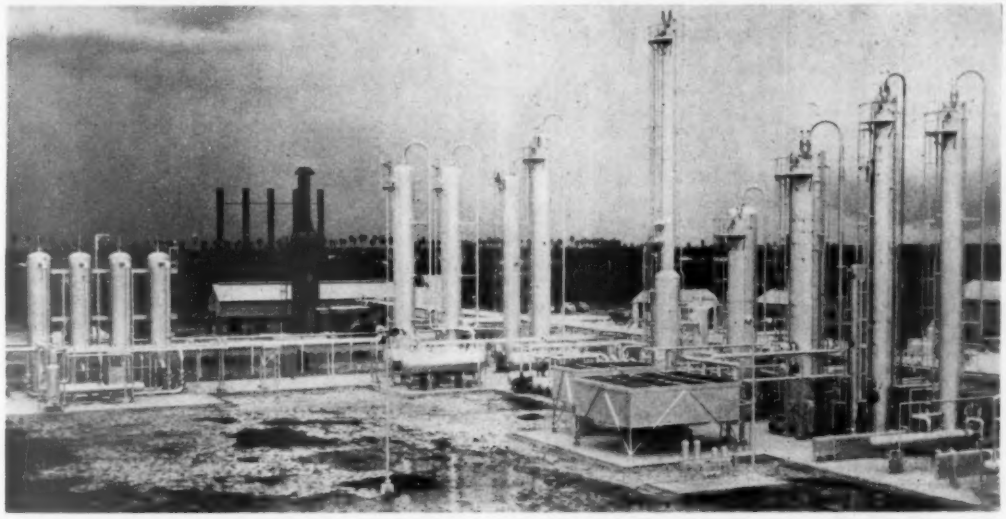
Nearby, Eastern States Petroleum Co. is reactivating its alkylation unit and expanding catalytic cracking capacity. Early in the year, Eastern States put on stream the first Udex aromatics extraction unit, which operates in conjunction with the new 7,000-bbl. Platforming unit, also placed on stream this year.

Shell Oil Co.'s program for the production of benzene and toluene in aromatic extraction units at its 115,000-bbl. Deer Park refinery will cost $10,400,000.

Lake Charles . . . Refinery capacity at Continental Oil Co.'s Lake Charles, La., plant will be more than tripled in



CONTINENTAL OIL CO. has earmarked $24,000,000 for expansion of its Lake Charles, La., refinery. The huge project is scheduled for completion late this year.



FIELD PROCESSING PLANTS in Gulf Coast area are adding substantial capacity. Pictured is a portion of cycling plant operated by Taylor-Mayfair Properties at McAllen, Tex. This plant is now processing more than 167 million cubic feet of gas daily.

a $24,000,000 expansion raising crude-oil charge capacity from 12,000 to 40,000 bbl. daily. Facilities include a twin T.C.C. catalytic cracking unit, crude-distillation unit, gas-recovery unit, Platformer, and sulfur dioxide aromatics extraction unit.

Cities Service Refining Corp. has plans for the building of a 20,000-bbl. Hydroformer at its 150,000-bbl. Lake Charles plant. The company also received authorization for a $26,650,000 project for the expansion of aviation-gasoline facilities.

New Orleans . . . In the New Orleans area, Shell Oil Co. has a $30,000,000 expansion program under way at its Norco refinery which will raise capacity from 50,000 to 75,000 bbl. daily. Principal single unit will be a large catalytic cracking plant. Crude-distillation facilities will be increased and an alkylation plant added.

Pan-Am Southern Corp., at Destrehan, has $5,500,000 earmarked for an expansion program, which will result in a 30,000-bbl. per day balanced refinery. Major units being added include a new Type 4, 12,000-bbl. fluid catalytic cracking unit, a sulfuric acid alkylation unit, a 2,000-bbl. fluid Hydroformer, a delayed-coking unit, and vapor-recovery units.

Early in the year, Bay Petroleum Corp. placed a 5,640-bbl. U.O.P. fluid catalytic cracking unit on stream at its 16,000-bbl. Chalmette refinery.

San Antonio . . . Here a 10,000-bbl. refinery will be realized in 1953 when a $10,000,000 project of Fulton & Olmstead is completed. The plant will include a 10,000-bbl. crude unit, a 4,650-bbl. cat cracker, and a 1,640-bbl. Platformer.

Materials shortage . . . Building activities have been hampered by the shortage of critical materials which hindered the delivery of major pieces of equipment. Copper and certain types of steel caused major stumbling blocks in otherwise smooth construction schedules. The uncertainty of delivery schedules plagued building programs, as some items would be in sufficient supply and others would be so scarce as to form bottlenecks which increased building time by 50 per cent or more.

Crude supply . . . The refiners were also faced at various times with spot shortages of crude, notwithstanding high aboveground stocks during the early spring months. Much depended upon the individual company and whether they were bolstered by a strong production department. However, a big problem was getting crude from remote fields into the refining centers along the gulf. This was aptly illustrated by one company which has ample West Texas production, but can't get the crude down to a Gulf Coast refinery because of transportation bottlenecks. These promise to be eliminated in part when two large crude lines to West Texas, now under construction, will be completed.

Natural gasoline . . . Growth on a smaller scale was also felt in the natural-gasoline industry. Ohio Oil Co., in conjunction with Sun Oil Co., is building a $4,100,000 gasoline plant in Matagorda County, Texas, which will have a capacity to process 100,000 M.c.f. of gas received daily from North Markham and North Bay City fields. Phillips Petroleum Co. placed on stream its $6,000,000 bayou plant which receives its supply from Chocolate Bayou field, Brazoria County. Distillate from this plant is piped to Phillips' Sweeny refinery for further processing.

Shell Oil Co. was announced as operator of a compressor and stripper plant to strip flare gas from wells in Helen Gohlke field in DeWitt and Victoria counties. The plant will be built in conjunction with Jergins Oil Co. of Texas, Humble Oil & Refining Co., and Kirby Petroleum Co. A doubling of expansion of Luby gasoline plant near Bishop, Tex., was completed so that the plant can now process 27,000,000 cu. ft. of gas per day. The plant, owned by Stanolind Oil & Gas Co. and Seaboard Oil Co. of Delaware, recovers 31,000 gal. per day of butane, 21,000 gal. of butane-propane mix, and injects 10,000,000 cu. ft. of stripped gas into the oil-producing formations.

PAN AMERICAN'S new gas pipe-line crossing of Galveston Bay. View after channel section had been floated in place.

LOWERING BARGE... Another Gulf Coast water-crossing operation. This is the Houston Ship Channel project of United's gas line.

The Gulf Coast *TODAY* . . .

. . . It Has Third of Nation's Gas— Expanding Transmission Facilities

Walter Rose

TEXAS and Louisiana, respectively, are the first and second largest gas-producing states in the United States. While there are other important producing areas in these states, the greatest reserves are in the Gulf Coast region. A large amount of the industrial growth of this region can be traced to this fact.

Recent developments which point to the importance of the Gulf Coast gas industry are:

1. Growth of gathering systems and pipe-line transmission systems originating in the Gulf Coast.

2. Upward trend in field gas prices, especially in South Louisiana.

3. Increased use of gas as an industrial fuel and raw material for the petrochemical industry.

4. Continued moves by conservation agencies in both Texas and Louisiana to minimize flaring and other waste of natural-gas resources.

5. Large net gain in reserves from year to year, in spite of increasing levels of gas production on the Gulf Coast.

Five years ago, R. J. Gonzalez placed gas reserves in the Gulf Coast at 60 trillion cubic feet, or more than one-third of the nation's reserves at that time. A more recent figure has been given by R. E. Davis *(The Oil and Gas Journal, September 27, 1951, p. 99)* as 65 trillion cubic feet, or 35 per cent of the United States reserves. Unquestionably, the indicated net gain of 5 trillion cubic feet for the 5-year period is too low a figure, for it is known that annual net gains in recent years have been of the order of 3 trillion cubic feet. The discrepancy is probably due to the fact that different authorities have in mind different areas when they refer to the Gulf Coast region.

If the reserves of the areas surrounding the Sabine Uplift and the Mississippi Salt Dome region are included in the Gulf Coast, the reserve figure applicable to 1951 when Davis made his estimate becomes about 85 trillion cubic feet. Assuming no future reserves are discovered, this amount would mean that the Gulf Coast could supply more than 10 billion cubic feet of gas daily for a 20-year period.

In some respects it is as unnecessary as it is difficult to make specific estimates of the Gulf Coast gas reserves. This is because:

1. The already proven reserves are so much greater than current rates of production.

2. Consistently large net gains in reserves are made each year.

3. The potential for finding additional sizable reserves in the foreseeable future is very great.

While there may be some danger in the optimism of the statement, "There is plenty of gas in the Gulf Coast," this danger has not been made evident historically by previous experience. For example, L. F. Terry has for a long time been an advocate of multiplying gas reserves by a factor greater than two to include reserves to be found in the foreseeable future *(The Oil and Gas Journal, April 14, 1952, p. 111)*. As justification for this Terry has previously pointed to gas reserves of 50 trillion cubic feet still to be found offshore in the Gulf of Mexico.

While the most recent American Gas Association reserves figure for the nation was about 194 trillion cubic feet, Terry has consistently referred to indicated reserves of more than 500 trillion cubic feet. In the Gulf Coast one authority has recently asserted that there are at least 30 trillion cubic feet of reserves as yet undedicated *(The Oil and Gas Journal, March 17, 1952, p. 173)*. At least one company is known to have about 14 trillion cubic feet in reserves which currently are undedicated and are not going into interstate commerce.

While any discussion of growth of natural-gas conservation measures will

necessarily include the associated phenomena of increasing gas prices and increasing domestic and industrial use of gas in recent years, the problem of conservation has not been attacked entirely on this basis. The flaring in the 1930's of more gas in one Gulf Coast field (Old Ocean) than was produced and used elsewhere in Texas inevitably led to the conclusion that gas flaring is inherently wasteful.

In Texas, gas flaring was averaging about 10 billion cubic feet monthly until early in 1949. The Texas Railroad Commission then became more insistent that either flaring would cease or field would be shut in. As a result the 102 billion cubic feet flared in 1948 was reduced to 42 billion cubic feet in 1949 and 28 billion cubic feet flared in 1950. In 1951, flaring increased to about 47 billion cubic feet due to surplus gas in West Texas. This situation has now been corrected. In any event gas flaring in the Texas Gulf Coast has been on a steady decrease up to the present time.

In the spring of 1952, the Railroad Commission proposed a new plan to further conservation. This requires that all producers of natural gas be held directly responsible to make a report on the disposition of this gas. This measure is intended among other things to avoid in the future unreported flaring of unmetered casing-head gas. At the present time there is perhaps 10 billion cubic feet of unreported gas flared annually in Texas.

During the last year, Louisiana has also made great strides in gas conservation through measures adopted by cooperation between producers and the Louisiana Conservation Commission. A survey has been made of all Louisiana fields where more than 1 million cubic feet daily is being flared. This survey showed that about 7 billion cubic feet was being flared monthly during 1951. More to the point, the survey disclosed in addition that by the end of 1953 the operators of these fields will have eliminated 70 per cent of this flaring, by adopting conservation measures ranging from reinjection of gas into the reservoirs for pressure maintenance to construction of pipe-line facilities so the previously flared gas could go to market.

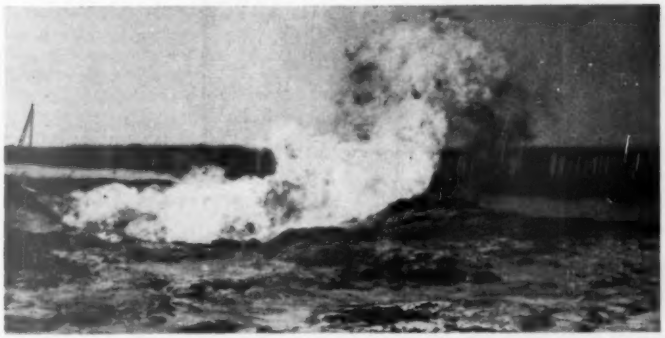
UNUSED CASING-HEAD GAS (UTILIZATION SURVEY, GULF COAST) DATA BY STATE OF LOUISIANA

Company—	No. fields involved	M.c.f. per month to be utilized in near future	Status of contracts	Date of anticipated delivery
Amerada Petroleum Corp.	1	40,207	A	1953
The California Co.	11	760,891	B-H	1952-53
Continental Oil Co.	1	66,069	B	Mid-1952
Gulf Refining Co.	3	782,087	..	.....
Humble Oil & Refining Co.	6	421,797	A	1953
Magnolia Petroleum Co.	2	61,561	B	Apr. 1952
Richardson & Bass (La. Acct.)	2	343,765	C	Early 1952
Shell Oil Co.	5	526,171	A-B-D	1952
Sohio Petroleum Co.	2	98,044	D-B	Early 1952
Stanolind Oil & Gas Co.	1	36,020	A	.....
Superior Oil Co.	1	18,000	..	.....
The Texas Co.	10	1,424,936	A-B-D-F	1952-53
Tide Water Associated Oil Co.	1	487,419	..	.....
Total M.c.f. per month		5,066,964		

A—Working on contract to deliver gas. B—Awaiting installation of compressors. C—As yet no definite means of utilization decided upon; either (1) compress and sell to pipe line; (2) install carbon-black plant; or (3) compress and return to formation. D—Pipe line in process of construction. F—Compressor barge on order. H—Awaiting pipe-line construction.

Development Trends

There have been a number of recent developments in the Gulf Coast gas industry which deserve attention. A number of these will be discussed below to illustrate current trends.



GAS FLARES such as this one are short and temporary in Gulf Coast area. Soon this 9,000,000-cu. ft. per day of gas will be moved by pipe line to serve a field gas-injection project.

Government issues . . . The issue of federal regulation of natural-gas production was kept alive by the Phillips Petroleum Co. case. Although the Federal Power Commission finally ruled it had no authority to regulate Phillips production, request for a court decision to clarify the situation is expected.

The controversy over export of Texas gas to other states has continued. The state has levied a gas-gathering tax applying to gas produced for out-of-state use. The constitutionality of this levy has not yet been decided.

Gas from oil companies . . . Late in 1951, Humble Oil & Refining Co. and Southern Production Co. negotiated a very large trade of gas reserves in Pledger (Texas) and Duck Lake (Louisiana) fields *(The Oil and Gas Journal, December 20, 1951, p. 369)*. More than 700 billion cubic feet of gas is involved (75 M.M.c.f. daily over a 20-year period). Early in 1952 *(The Oil and Gas Journal, February 11, 1952, p. 72)* Humble was reported to have offered Panhandle Eastern Pipe Line Co. 150 M.M.c.f. daily—principally from Gulf Coast fields—for delivery to eastern Canadian markets.

Higher gas prices . . . Plans announced by the large gas-transmission companies operating in the Gulf Coast for expansion of present capacities explain in part why field prices for gas are now

as high as 15 cents per M.c.f. in Louisiana and 10 to 12 cents per M.c.f. in the Texas Gulf Coast. Transcontinental Gas Transmission Corp. has announced a projected 4-year expansion program which will add 535 M.M.c.f. daily capcacity *(The Oil and Gas Journal, March 17, 1952)*. United Gas Pipe Line Co.'s current expansion will add about a billion cubic feet daily capacity *(The Oil and Gas Journal, May 12, 1952, page 111)*. Texas Eastern reports an expansion program nearing completion which increases delivery ten-fold over the last 5 years *(The Oil and Gas Journal, May 12, 1952, page 126)*.

Pipe-line expansions . . . Plans for increased capacity by existing transmission lines are competitive with projects proposed by newly formed companies. Thus there is competition for the same reserves and the same markets; there is competition for the same steel which during the last year has been in short supply. At the present time there are two major projected new gas-transmission lines to tap Gulf Coast reserves, and other projects which have been temporarily deferred. The Gulf-Michigan project is an example of the latter.

On the other hand, Texas-Ohio is seeking FPC approval of a 500-million-cubic-feet-daily pipe line, and the Columbia Gas interests are promoting the formation of a pipe-line company to transport gas reserves they intend to secure in the Gulf Coast. The Texas-Ohio project is of interest in that the point of law has been raised on whether or not reserves and market contracts must be exhibited before FPC approval can be granted.

It is also of interest in that Mexican gas reserves may be involved because of the current great competition in securing Texas Gulf Coast reserves. The Columbia project is unique from the standpoint that the pipe-line company, to be called Gulf Interstate Pipe Line Co., will simply transport reserves to be purchased by Columbia in the Gulf Coast to the Columbia pipe-line distribution system in the East. This will be done on a fee basis.

Increasing costs . . . G. F. Mitchell, president of the American Gas Association, has shown that pipe lines cost about 85 per cent more than 10 years ago and that materials are up 180 per cent *(The Oil and Gas Journal, March 31, 1952, page 57)*. This, together with increased taxes and higher delivery costs, is making the gas industry feel the pinch of growing pains. A 4.5-billion-dollar expansion program is planned during the next 5-year period.

While it is agreed that the increase in field prices for gas (12 to 15 cents today as compared with 4½ cents 10 years ago) serve as a tonic to the gas industry, it is asserted that the gas industry should be allowed more than 6 per cent as a rate of return on investment.

Petrochemical supply . . . At the recent Southern Gas Association meeting *(The Oil and Gas Journal, May 5, 1952, page 163)* data were presented which clearly show the increased use of natural gas as a fuel and raw material for the expanding Gulf Coast petrochemical industry. For example, it was shown that 10 billion cubic feet is used annually to produce formaldehyde; 66 billion cubic feet annually for methanol; 1 billion cubic feet annually for mehyl chloride; one-half billion cubic feet annually in the electroylsis of brine for caustic and chlorine production; and 100 billion cubic feet annually for ammonia. These figures typify the growth of the petrochemical industry which has been made possible by the proxmity of Gulf Coast gas reserves.

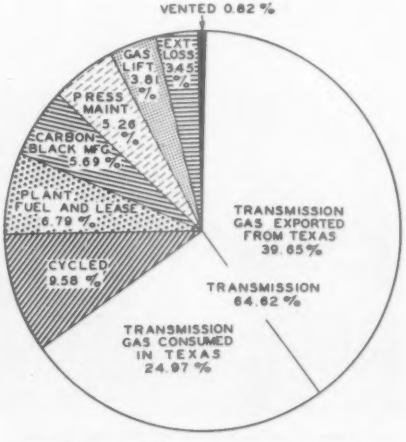
Offshore gas . . . The installation of United's offshore pipe-line system is one of the many interesting developments during the last year. This 20-in. line runs 15 miles into the open gulf to tap reserves in offshore reservoirs. The accomplishment of this engineering feat is proof that the indicated reserve of 50 trillion cubic feet in the Gulf of Mexico will eventually be brought to market.

Production and drilling . . . About 69 per cent of Texas' current production of 13.5 billion cubic feet of gas daily occurs in the Gulf Coast region. Louisiana is producing about 3.4 billion cubic feet daily. Current production represents increases of 20 to 40 per cent over a year ago.

It is of interest to note that 82 per cent of the Texas Gulf Coast production comes from gas wells (the rest coming from casing-head gas). The Texas Gulf Coast has about 50 per cent of Texas' gas wells.

Figures given by F. H. Lahee for 1951 exploratory drilling *(The Oil and Gas Journal, April 7, 1952 page 99)* show 202 gas and condensate wildcat discoveries in Texas for 1951, and 52 like discoveries in Louisiana. Lahee's figures show that the ratio of these discoveries to total exploratory wells drilled (dry holes as well as gas, oil, and condensate discoveries) is higher on the Gulf Coast than in the nation at large.

TODAY'S CONSERVATION is typified by this entry of 10 million cubic feet daily of previously flared gas into United's Mississippi delta pipe line. Venice field compressor station of Tide Water appears in background.


VENTED 0.82 %
EXT. LOSS 3.45 %
GAS LIFT 3.81 %
PRESS MAINT 5.26 %
CARBON BLACK MFG. 5.69 %
PLANT FUEL AND LEASE 6.79 %
CYCLED 9.58 %
TRANSMISSION GAS EXPORTED FROM TEXAS 39.65 %
TRANSMISSION 64.62 %
TRANSMISSION GAS CONSUMED IN TEXAS 24.97 %

Disposition of all Texas gas is shown in this chart.

OVER-WATER PRODUCTION is common sight near Gulf of Mexico. This is a Stanolind Oil & Gas Co. operation at Black Lake, Hackberry area, Cameron Parish, Louisiana.

The Gulf Coast *TODAY* . . .

. . . It Produces More Than Two Million Barrels of Oil Per Day

Walter Rose

DURING the last 12-month period, oil has been produced at a rate in excess of 2 million barrels daily from the many Gulf Coast reservoirs. This was more than one-third of the total United States production and almost 20 per cent of the world production.

The fact that the Gulf Coast holds some 40 per cent of the United States proven reserves (10 per cent of the world reserves) indicates that its position of importance will be maintained in the years ahead, even though substantial gains are made in other areas.

While the Gulf Coast productive capacity is due basically to the early and continued development of what have proved to be substantial reserves, other factors can be cited as indicative of a continuance of a high level of exploration and exploitation activity. These are:

1. The proximity of Gulf Coast reserves to important refining, transportation, and utilization centers.

2. The great incentives existing for the oil industry to find the now hidden reserves of the Gulf of Mexico tidelands.

Related factors (which, however, affect the country at large as well as the Gulf Coast) are:

3. The loss of Iranian oil in the world markets.

4. The growing demands of the snowballing defense program.

In most Gulf Coast districts production today stands at levels somewhat above those attained during the 1948 peak year. Particularly noteworthy is the record of increasing production achieved in South Louisiana in the last several years. While all other major producing areas in the Gulf Coast suffered sharp setbacks during the recession year of 1949, South Louisiana steadily increased production. It now stands at more than 33 per cent above 1948, and at more than 70 per cent above 1946. South Louisiana has a straight-line production curve which since 1946 shows that consistent increases in production of about 40,000 bbl. per day per year have been recorded.

South Louisiana . . . The production performance of Railroad Commission District 3 of Texas can be used to show the contrast between South Louisiana and the rest of the Gulf Coast areas. In 1946, District 3 produced about 450,000 bbl. daily, or 50 per cent more than South Louisiana. A similar advantage held through 1948, but in 1951 and today South Louisiana was and is producing more oil than District 3. Production figures for these two areas in 1951 stood at 515,000 bbl. per day and 494,000 bbl. per day respectively, these amounts taken together representing about one-half the Gulf Coast production.

There are several reasons for this comparison. Both District 3 and South Louisiana have similar land areas (about 25,000 sq. miles). Both are similarly located with respect to the Gulf of Mexico and to the underlying Continental Shelf provinces, and both regions have comparable proven oil reserves. Moreover, both have access to similar refining and crude-oil transportation facilities.

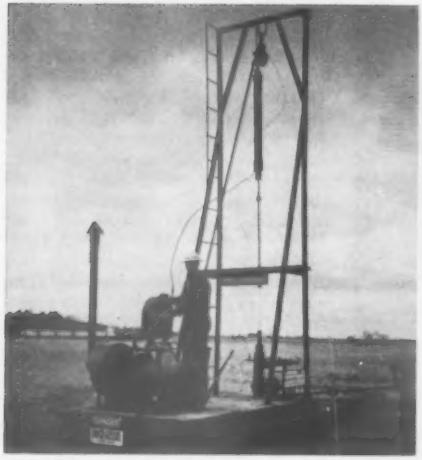
Terrain Problems Enormous

One reason which might be considered to explain the phenomenal growth of oil production in South Louisiana is that while Jennings (1902) followed soon after Spindletop (1901), subsequent development in South Louisiana has been slowed by terrain problems hindering accessibility to well-site locations. Development has also been slowed because the deeper Louisiana producing formations have required the use of more costly drilling techniques.

The fact that cumulative production in District 3 (6.5 per cent of United States total) stands at almost twice as much as has been produced in South Louisiana to date (3.8 per cent of United States total), shows that development of reserves in the latter area is of more recent occurrence. On the other hand, it is of interest to note that while there are six fields in Texas' District 3 presently having proven reserves in excess of 100 million barrels, no such giant fields exist in South Louisiana.

Further, District 3 has eight fields with 1951 production in excess of 5 million barrels, of which four had production in excess of 10 million barrels. South Louisiana had six fields producing more than 5 million barrels in 1951, but none of these produced as much as 10 million barrels. These considerations, illustrated more fully by the information contained in Table 1, make the current level of production in South Louisiana all the more outstanding.

In 1951, a similar number of wells



GAS LIFT . . . Pumper is winding clock on intermitter for this Gulf Coast well.

CORROSION . . . Salt water has played havoc on unprotected pipe on a stripper lease at Spindletop.

were drilled in South Louisiana (991) and in Texas' District 3 (931), this drilling being equivalent to about 9.5 million feet of hole in each case (see Table 2). However, fewer dry holes were drilled in South Louisiana (372) than in District 3 (501), and this again points to how South Louisiana is fast becoming the leading production center of the Gulf Coast. South Louisiana increased its net reserves by 280 million barrels in 1951, more than 10 times the gain in District 3. All other Gulf Coast areas showed losses in reserves.

Another factor which holds promise of being important in the future is the favorable water depths in the Continental Shelf region offshore from Louisiana. Here shallow waters extend out to greater distances than in the Texas Gulf Coast, and thus water exploration, drilling and production in the Louisiana tidelands are facilitated.

Offshore production . . . Current production from the tideland waters contiguous to South Louisiana only stands today at about 18,000 bbl. daily. (No oil is currently being produced offshore from Texas). Inasmuch as this amount is less than 4 per cent of the total South Louisiana current production, it is readily seen that reactivation of the offshore exploration and exploitation operations holds promise of contributing more to future high levels of production, rather than to current levels.

In recent weeks there have been increased numbers of exploration and drilling permits solicited by operators. For, in addition to the incentive of meeting the nation's demands for increased amounts of oil and increased

TABLE 1—GULF COAST CRUDE-OIL PRODUCTION BY MAJOR FIELDS
(All figures in thousands of barrels)

Field—	1951 total production	January 1, 1952 Cumulative	January 1, 1952 Estimated reserves	January 1, 1952 No. of wells
SOUTH LOUISIANA:				
Bayou Sale	5,088	38,537	51,462	76
Caillou Island	6,509	63,702	46,298	104
Delta Farms	7,194	46,417	53,583	117
Erath	5,245	46,950	78,050	31
Venice	5,756	39,520	60,480	76
Weeks Island	8,112	16,700	83,300	75
DISTRICT 3, TEXAS:				
Anahuac	7,816	108,852	156,148	329
Conroe and West	14,270	307,471	292,529	852
Chocolate Bayou	5,107	15,691	44,309	95
Hastings	16,789	213,246	286,754	649
Old Ocean	6,322	65,728	134,272	145
Thompson	13,020	165,937	154,063	344
Webster	15,179	165,196	284,804	207
Katy and North	7,936	37,220	87,780	66
OTHER IMPORTANT GULF COAST FIELDS:				
East Texas (Texas District 6)	99,646	2,877,058	2,222,942	21,468
Van (Texas District 5)	9,792	220,911	179,089	579
Agua Dulce (Texas District 4)	8,711	90,019	134,981	466
Baxterville (Mississippi)	6,381	27,569	67,431	173
Tinsley (Mississippi)	5,117	122,900	57,100	284
Delhi-Big Creek (North Louisiana)	8,095	53,574	121,426	392
Lake St. John (North Louisiana)	6,800	44,042	50,958	146

TABLE 2—CRUDE-OIL PRODUCTION ON GULF COAST, BY AREAS

Area—	Production (thou. of bbl. per day) 1951	Production (thou. of bbl. per day) 1950	January 1952 reserves (millions of bbl.)	Completions 1951	Dry holes 1951
Southwest Texas	290	239	1,485	1,082	665
Texas Gulf Coast	659	547	3,220	1,706	837
East Texas	444	397	3,130	...	...
North Louisiana	119	121	430	1,249	474
South Louisiana	515	451	1,880	991	372
Mississippi	102	105	405	375	229
Alabama	2.8	2.0	4	50	33
Florida	1.6	1.3	3	2	2
Total Gulf Coast	2,134	1,890	10,557	5,455	2,612
Total United States	6,149	5,402	27,537	44,516	16,653

reserve producing capacity, operators are faced with the necessity of trying to win back some of the investment which they had made before the tidelands ownership controversy stopped activity. They are also faced with expiring leases and rising costs of maintenance of idle offshore equipment. This, coupled with the fact that some equipment had to be reactivated anyway for workover of wells where production was falling off, has done much to force the issue of reactivation.

At the beginning of 1952, offshore drilling was limited to prevention of reservoir drainage by offset operators and to reserve confirmation wells. Rank-wildcat exploratory wells are now being drilled. It has been estimated by Bruce K. Brown, Petroleum Administration for Defense exdeputy administrator, that the reactivation of tidelands drilling would increase South Louisiana's offshore production more than tenfold (up to in excess of 200,000 bbl. daily). With this as a prospect, the prominance of the Gulf Coast in general, and South Louisiana in particular, as a major United States producing center can be expected for years to come.

Current production . . . Information bearing on crude-oil production and reserves is given by areas in Table 2.

It is of interest to note with respect to the present productive capacity of the Gulf Coast region, that the 2.13 million barrels produced daily in 1951 is appreciably less than the Gulf Coast's 1952 rated refining capacity. The latter, according to a recent PAD survey, has been indicated to be about 2.51 million barrels daily. Thus it is seen that the million-barrel-daily pipeline capacity from West Texas to the gulf region in effect simply moves crude which for the most part must in turn be carried by tanker lifting to other (East Coast) refining centers.

TABLE 3—CRUDE-OIL AVAILABILITY

District—	Per cent increase in availability, 1955 over 1950	PAD estimate of 1955 availability (thou. of bbl. per day)
Alabama	700	16
Texas Dist. 5	110	75
Texas Dist. 2	82	240
Texas Dist. 4	77	367
Texas Dist. 3	75	690
Texas Dist. 1	62	48
Texas as a whole	57	3,756
South Louisiana	55	700
Gulf Coast as a whole	52	2,827
Louisiana as a whole	43	820
U. S. as a whole	41	7,613
Texas Dist. 6 (incl. East Texas)	22	465
Mississippi	2	106
North Louisiana	*1	120
East Texas field	3	282

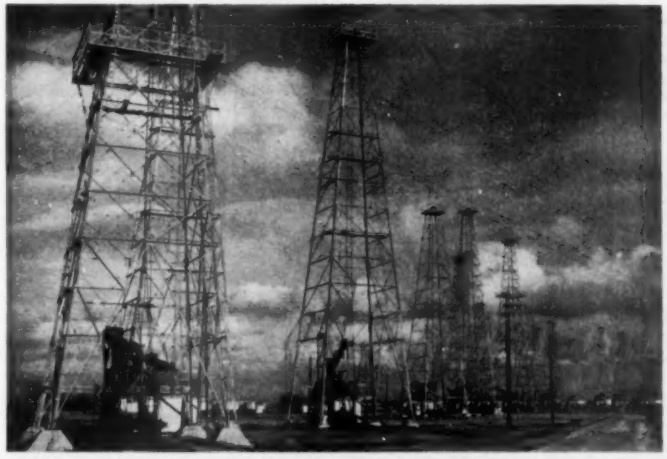
*Decrease.

OVER-WATER CAT WALK . . . This pumper is Stanolind's Well No. 70, State lease, Black Lake field, Louisiana.

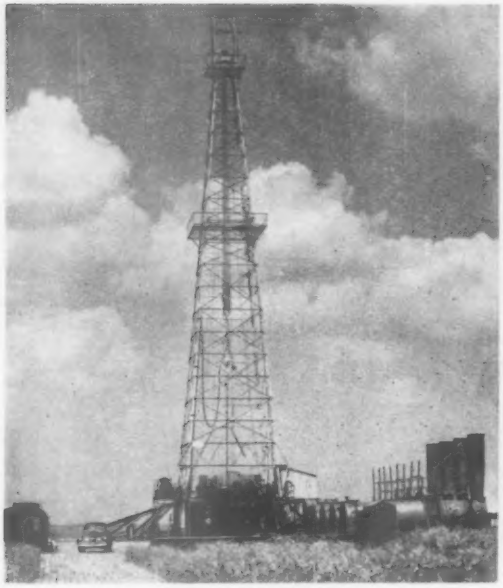
The future . . . Table 3 shows estimates of future availability of crude, as reported by PAD from recent studies.

PAD predicts that availability of crude oil in the United States in 1955 will be 41 per cent greater than the 1950 production. Most Gulf Coast districts show a greater increase as Table 3 shows.

The figures of Table 3 show that while there are some Gulf Coast districts which hold little promise of maintaining or increasing their productive capacity (e.g., East Texas field, Mississippi, North Louisiana), the role played by Gulf Coast producing districts in the nation's economy will be every bit as important in 1955 as it is today. For while the Gulf Coast provinces are now producing 35 per cent of the nation's oil, PAD's figures show that the Gulf Coast will have 37 per cent of the nation's available production in 1955. Should an all-out war develop, the importance of the Gulf Coast producing capacity will become even greater, since this is the oil which is geographically near the major refining centers. It is the oil which can be moved with minimum increases in crude trunk lines.



ROW AFTER ROW . . . These pumping units are part of 108 Stanolind wells in world-famous Spindletop field. On January 10, 1901, the Lucas discovery blew in at 100,000 bbl. per day to inaugurate the Gulf Coast's oil-producing history.



PLANK ROAD . . . and big steam rig. Photo of Humble operation, Angleton, Tex.

PINEY WOODS . . . Another drilling scene often found in Gulf Coast territory.

The Gulf Coast TODAY . . . Development Drilling Continuing Apace Despite Tubular-Goods Shortage

W. Van London and L. D. Owen

DEVELOPMENT drilling on the Gulf Coast is continuing at a steadily increasing pace this year despite shortage of tubular goods. Statistics show that during the first 4 months of this year, Gulf Coast operators drilled 1,544 wells which is an increase of 169 wells over the 1,375 wells drilled during the last 4 months of 1951. Of these 1,544 wells, 1,029 were completed as oil wells, 100 as gas wells, and 415 as dry holes.

The area included in the Gulf Coast is Texas Railroad Commission Districts 1, 2, 3, and 4, South Louisiana, Mississippi, Georgia, Alabama, and Florida.

Those areas in which development drilling has shown a decline in number of wells completed are South Louisiana and Texas District 2. However, the decline is very slight, averaging about one well per month.

With the exception of Mississippi, the number of wells drilling on May 1 of this year had increased sharply in every area, over the number drilling on January 1. This increase can be directly related to the fact that oil companies are allotting more money for drilling, plus the loosening of restrictions placed on steel.

Texas Activity

The upper Texas coast (Districts 2 and 3) has had a sharp increase in drilling with 48 more wells under way on May 1 than January 1. The encouraging results of discoveries in the Wilcox and Yegua formations probably account for this stepped-up drilling campaign.

Gulf Oil Corp. opened a Wilcox pool in Grimes County late in 1951. The firm has approximately 12,000 acres under lease in the area and it is indicated that considerable drilling will be done to develop it. In the northwestern portion of the county, shallow Wilcox production was established by Woodley Petroleum Co.

Following this trend to the southwest, Lavaca, Austin, and Chambers counties have experienced good Wilcox discoveries and drilling has increased considerably in each county. Bee County has maintained a steady drilling pace since the first of this year, resulting in five oil discoveries and one gas discovery. Development activity has resulted in 19 oil wells and 1 gas well.

Brazoria County has been the most active county on the upper Texas coast this year with both wildcatting and development drilling on the increase. The county gained nine wells during the first 4 months with drilling concentrating around the established Damon Mound and Danbury fields. Chocolate Bayou field continues to be drilled, with three rigs currently operating in the field.

Liberty County, also on the upper coast, rates second in activity, with the majority of drilling being done on the flanks of old salt domes. Operators continue to seek and develop good reserves at Hull, South Dayton, South Liberty, and Esperson domes. Discovery of productive Yegua formations on the flanks of these domes has lent impetus to drilling activity.

Jefferson, Harris, and Hardin counties have increased in activity, and, as

CALCO RIG . . . Near Bay Coquille, south of New Orleans.

ROWAN DRILLING . . . View of contract drilling in Gulf of Mexico.

in the case of Liberty County, the drilling is principally around established fields such as Sour Lake, Goose Creek, Batson, South Houston, Humble, Clinton, Spindletop, and Big Hill.

The long-established Yegua production has had an upsurge in development with discovery of Fulshear field in Fort Bend County, located 3 miles south of Katy field. Since its discovery last year, two additional Yegua sands have been established. Nine oil wells have been completed in the field to date. Production is from a faulted closure.

Durkee field, located just northwest of Fairbanks field which has been the only good fault-line Yegua field in the upper coastal area, received two new Yegua pay sands. This set off a flurry of activity which has resulted in 14 oil wells being completed in the field.

In the central coastal area of Texas, Goliad, Bee, Victoria, and DeWitt counties are leading in activity. Berclair field in Goliad County had seven rigs operating on May 1. This multipay field produces both oil and gas from shallow zones.

DeWitt County, which has several good Wilcox fields, has declined slightly in drilling since the first of this year. However, Helen Gohlke field is still being rapidly developed. This Wilcox pool, which was discovered in 1950, was extended into Victoria County last year, and is considered the best Wilcox pool discovery on the Gulf Coast since World War II. Since its discovery, 55 oil wells, 2 gas wells, and 2 dry holes have been completed. Late in 1951, Yegua production was established, as well as another pay in the Wilcox series. In March of this year, Sun Oil Co. extended the field 2 miles to the southwest. It has been estimated that each oil well in Helen Gohlke field will produce approximately 1,000,000 bbl.

Victoria County drilling has increased in both exploration and development since the first of the year. Currently, seven wildcats are drilling in the county, with development drilling being conducted around Helen Gohlke, Pridham Lake, and Placedo fields.

Discovery of Edwards lime production has spurred an active wildcatting and development campaign in Guadalupe, Wilson, Atascosa, Caldwell, and Williamson counties. This area has been relatively unexplored; however, a fault line running from northeast to southwest has increased the interest of oil men and a heavier drilling program is scheduled for this country.

Farther to the west, in Val Verde County, first production from the Strawn lime was established below 10,000 ft. This was also the first production in the county. Subsequent drilling confirmed this production, and it is believed that it is on a trend with production in the Permian basin of West Texas.

Big Foot field in Frio County, which produces from a shallow level, has had the fastest development program in Southwest Texas with more than 50 oil wells and 3 dry holes being completed in the last year. Production in this field is from the Taylor series.

Discovery of Queen City oil production in Frio and Atascosa counties spurred activity in these two counties. Ronnie field in Frio County and Muil field in Atascosa County are new Queen City fields, which have received a good development program. Queen City production has just this year been established in Jourdantown field, Atascosa County, and Government Wells field, Duval County.

Drilling in the lower Texas coastal area (District 4) has had the sharpest increase this year with 50 more wells drilling on May 1 than on January 1. The demand and market for natural gas, plus the accessibility of an outlet for the gas, accounts for most of this increase.

Heaviest drilling is being conducted in Nueces County where the bay waters overlie tremendous oil and gas reserves. Gas pipe-line companies have laid offshore lines to these wells, thus increasing the drilling interest from an economic standpoint. Both Mustang Island and Redfish Bay fields, which are located approximately 1 mile apart, and are believed to have some pay sands that are common reservoirs, have been extensively developed. Currently, the two fields have 11 active wells drilling, with locations staked for 8 ad-

ditional holes. Both are multipay fields yielding both oil and gas.

Jim Wells County has received two good Vicksburg sand discoveries which show promise of being good reserves. Little Rose and Howell fields, both discovered this year, are being rapidly developed.

An active drilling campaign is under way in San Patricio County with most of the drilling being done at West Sinton field. This is a multipay field, which is scheduled for extensive development. Portilla field is also experiencing a good drilling program.

Gulf Coast operators continue to develop Hoffman field in Duval County. More than 50 oilers have been added to the field within the past year.

Discovery of upper Rosenberg (Yegua) production in Webb County set off a flurry of activity which has resulted in several good, if small, fields. Production from this formation is relatively shallow. Tal Vez, Walker, and Billings fields produce from this formation, and are being actively developed.

Concentrated drilling is being done in Aransas County at Copano Bay, West Fulton Beach, and Blackjack fields. Both Copano Bay and West Fulton Beach are located in the submerged lands, and both produce oil and gas.

Louisiana Drilling

Although South Louisiana has experienced a decline in the number of wells completed during the first 4 months of this year, as compared with the last 4 months of 1951, drilling activity has shown an increase since the first of the year. Since January 1, 274 development wells have been completed, 185 of which were oil wells, 9 were gas wells, and 80 were dry holes.

The Mississippi River Delta area in Plaquemines Parish has produced the most prolific fields within the past year from the standpoint of reserves, and the parish continues to lead in a development program. Coquille Bay, discovered by The California Co. last year, has proved to be the best new field and development has been fast. Cox Bay, Lake Washington, and Romere Pass fields remain active and are being rapidly developed.

Lafourche Parish rates along with Plaquemines in number of wells being drilled. This is also in the delta area where excellent deep reserves are found. Clovelly field, discovered last year, now has one well drilling, with locations staked for four more. East Golden Meadow, annother new field, is scheduled for considerable drilling. Timbailer Bay, owned by Gulf Refining Co., is currently the most active field with three wells in the process of being completed and locations staked for five more.

Terrebonne Parish is receiving its share of activity in both exploration and development. Established fields such as Caillou Island, Bay St. Elaine, and Lake Pelto are the most active in the parish.

During the spring of this year, an offshore discovery in Main Pass Block 35 was completed for oil, and the field now has two rigs drilling with location staked for two additional tests. This field lies within the offshore area claimed by the federal Government.

Cessation of activity in the tidelands has affected drilling in South Louisiana more than any other one particular factor. Only recently, however, four major operators owning leases in the offshore waters secured permits from the federal Government to resume development drilling. Currently, Pure Oil Co. is drilling in Eugene Island Block 32 field; Magnolia Petroleum Co. in Eugene Island Block 45 field; and The California Co., in Main Pass Block 32 field. Kerr-McGee Oil Industries, Inc., has staked location for a 15,000-ft. test in Ship Shoal Block 28 area. It is premature to predict just how much development will occur on the Continental Shelf this year, but the area has definitely been reactivated.

Discovery of deep Wilcox sands in Hurricane Creek field, Beauregard Parish, has kicked off a drilling campaign in South Louisiana, to develop these sands. While Magnolia's well in this field has proved to be the best to date, operators are definitely attempting to explore the Wilcox belt for production.

OFFSHORE . . . Air photo of rig working for The California Co. This location near Bay Coquille.

Drilling around the salt domes in Iberia Parish continues to pay off in good reserves. Weeks Island is the most active with five wells under way and locations staked for six additional wells. Most of the wells in this field are completed below 12,000 ft.

One of the most interesting operations in South Louisiana is Magnolia 1 Ragley Lumber Co. "D," Allen Parish, which is bottomed at 18,660 ft. The well established a new depth record for the entre Gulf Coast and was extensively tested before being abandoned.

Mississippi Activites

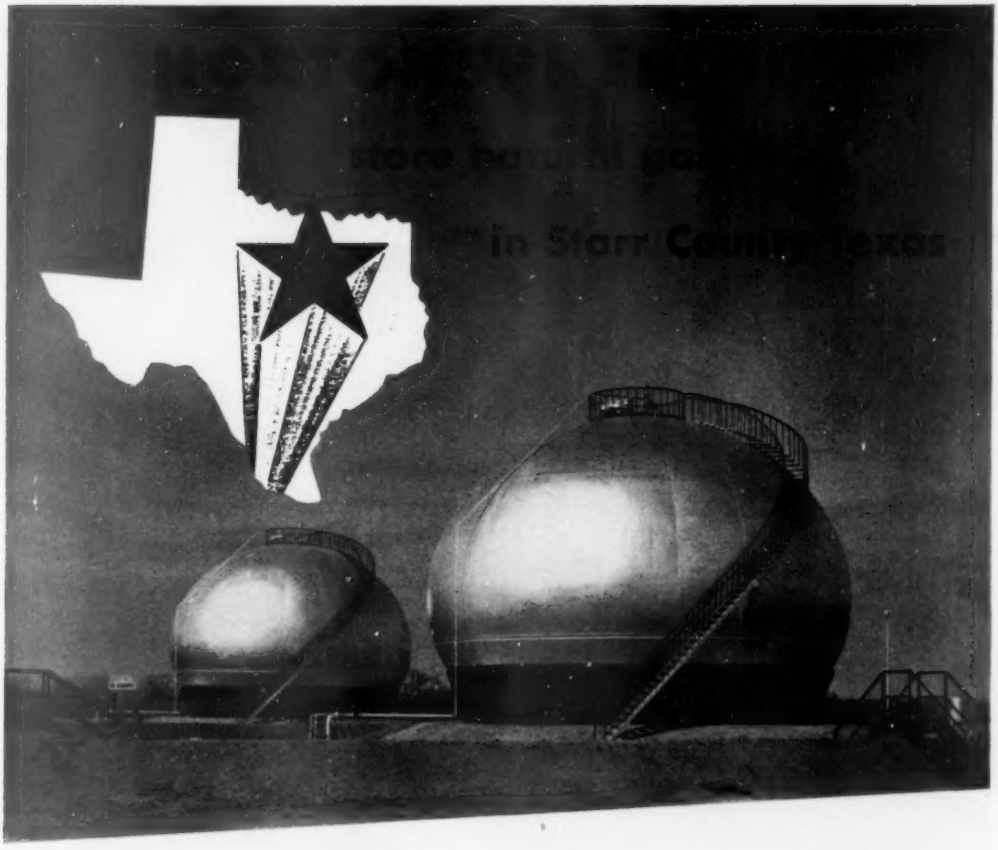
Mississippi has experienced a decrease in drilling since the first of this year, although the 1951 completion figures shattered all previous records. While more wells have been completed during the first 4 months of this year than the last 4 months of 1951, the number of new wells has slowly decreased, and it is reported that seismograph crews and rigs are both being moved out of the state.

Such a trend is difficult to account for, since new pools continue to be discovered and the prospects of gas production seem assured in the northeastern portion from the Middle and Lower Jurrassic rock formations.

Bulk of the drilling has centered in Adams, Franklin, and Wilkinson counties where the Wilcox formation has yielded several good oil pools. Fayette field in Jefferson County, and North Natchez in Adams County, are the best new fields establishing good reserves.

The number of wells drilled in Alabama has increased slightly. However, the state is scheduled for a heavier drilling program due to discovery of oil in Escambia County by Humble Oil & Refining Co. The firm currently has two wells under way in the field and has locations staked for five more wells. Activity is nil in South Carlton field, Choctaw County, and Gilbertown field, also in Choctaw, currently has one well drilling.

While none of the field drilling on the Gulf Coast is particularly spectacular, operators continue to bore holes at an ever-increasing rate. New reservoirs are being tapped daily, thus insuring good oil reserves. Oil men are taking a second and third look at the old established fields, and it is believed that upon this reexamination depends much of the oil future of the Gulf Coast.



★ The two 10,000-bbl. Hortonspheroids shown above store natural gasoline at the Sun Oil Company's new plant in Starr County, Texas. Located 60 miles northwest of McAllen, Texas, the Sun natural gasoline plant processes gas from the Sun, North Sun, South Kelly, North Rincon, La Copita, Davenport, Yturria and Garcia fields.

None of the fields mentioned above has sufficient gas production to warrant the installation of an absorption plant. By combining output, however, a modern plant that recovers propane, butane and natural gasoline from the gas can be operated economically.

The Sun natural gasoline plant is designed to handle 35,000,000 cubic feet of natural gas daily. Operating at capacity, the new plant will recover daily about 29,000 gallons of propane, 33,000 gallons of butane, 38,000 gallons of natural gasoline and a small amount of kerosene or distillate.

Hortonspheroids are used to store natural gasoline at the Starr County plant to protect volatility and octane rating. They are designed specifically to reduce the excessive evaporation losses that would occur if volatile liquids were stored in conventional tanks. Fire hazard encountered in the storage of natural gasoline is also reduced.

Hortonspheroids are built in standard capacities up to 120,000 bbls. Write our nearest office and request Bulletin E for further details. There is no obligation on your part.

CHICAGO BRIDGE & IRON COMPANY

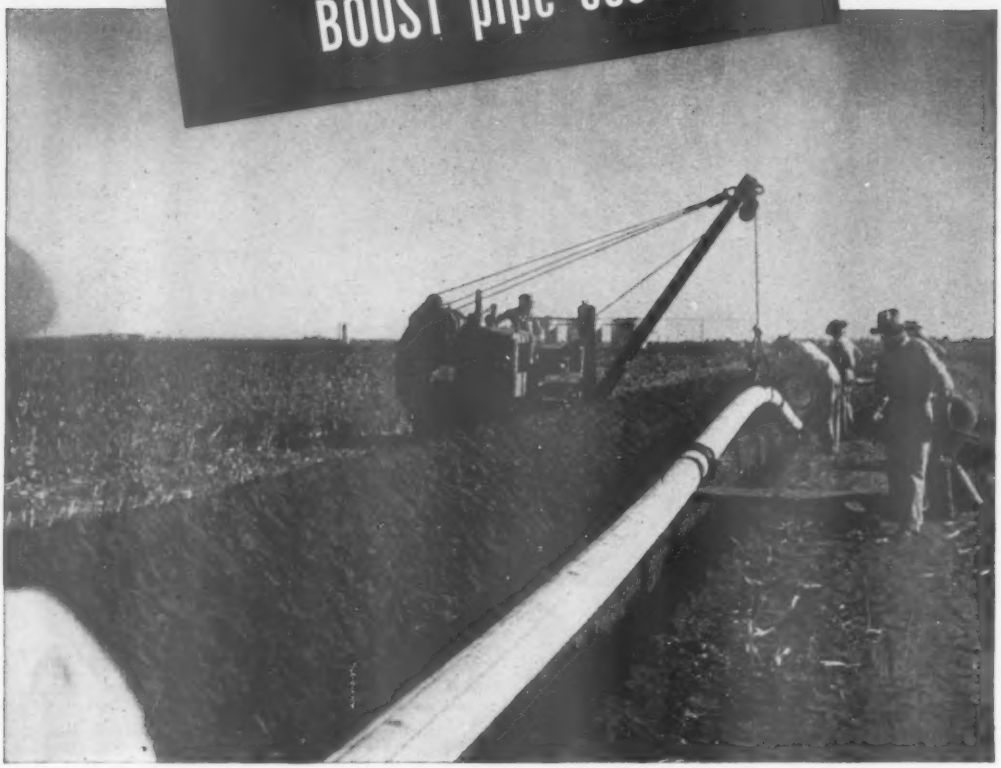
Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PENNSYLVANIA

Atlanta, 3.....2154 Healey Bldg.
Birmingham, 1.....1536 North 50th St.
Boston, 10.....1025—201 Devonshire St.
Chicago, 4.....2128 McCormick Bldg.
Cleveland, 15.....2204 Guildhall Bldg.
Detroit, 26.....1514 Lafayette Bldg.
Havana.....402 Abreu Bldg.
Houston, 2.....2119 C & I Life Bldg.
Los Angeles, 17.....1523 General Petroleum Bldg.
New York, 6.....3347—165 Broadway Bldg.
Philadelphia, 3.....1615-1700 Walnut Street Bldg.
San Francisco, 4.....1544—200 Bush St.
Seattle, 1.....1325 Henry Bldg.
Tulsa, 3.....1606 Hunt Bldg.
Washington 6, D. C.....1139 Cafritz Bldg.

REPRESENTATIVES AND LICENSEES

Horton Steel Works, Limited, Fort Erie, Ontario, Canada
Ateliers et Chantiers de la Seine Maritime, Paris, France
Constructions Metalliques de Provence, Arles-sur-Rhone, France
Chicago Bridge & Iron Company, Ltd., Apartado 1348, Caracas, Venezuela
Comprimo, N.V., 21, Amstel, Amsterdam (C) Netherlands
Compagnia Tecnica Industrie Petroli, Rome, Italy
Whessoe, Limited, Darlington, England
Motherwell Bridge & Engineering Company, Limited, Motherwell, Scotland
Sociedade Chibridge de Construcoes Ltda., Av. Franklin Roosevelt, 194-S/704-C, Rio de Janeiro, Brazil

Don't let "TAGALONG" metal BOOST pipe costs



You can usually find the exact wall thicknesses and diameters you need for line pipe jobs when you specify Armco Steel Pipe. This makes it easy to avoid paying for costly and useless "tagalong" metal, not warranted by job requirements.

With Armco Pipe you have a choice of 10 wall thicknesses between 3/64" and 1/2-inch in 20 diameters from 6 to 36 inches.

In addition, you gain the installation economies of lengths up to 50 feet. This means fewer sections to haul and handle and fewer field joints. Even these go together quickly as the specially-prepared ends simplify and speed field welding.

Besides economy, Armco Steel Pipe provides exceptional strength and flexibility. Slack loops and cold bends are no problem.

These are only a few reasons why you gain by specifying Armco Steel Pipe for gathering systems, line pipe and wherever else you need dependable piping. Write us for data applied to your specific needs. Armco Drainage & Metal Products, Inc., Welded Pipe Sales Division, 1242 Curtis Street, Middletown, Ohio. 201 KOME Building, Tulsa, Oklahoma. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.

ARMCO

ARMCO WELDED STEEL PIPE

MARSH BUGGIES . . . Exploration crews assist seismograph operations in lowlands.

The Gulf Coast *TODAY . . .*

. . . Indications Point to Another Record Year in Exploratory Drilling

W. Van London and L. D. Owen

EXPLORATORY drilling on the Gulf Coast has boomed this year, with a total of 639 wells being drilled during the first 4 months. Of this total, 103 produced oil, 27 produced gas, and 510 were dry. This wildcat drilling resulted in a success ratio of 20.3 per cent for the entire area. It is also an average of 160 wells per month, as compared with an average of 148 wells per month for the year 1951. Using these figures as a criterion, 1952 will be another record-shattering year.

The Gulf Coast area can be considered to include Texas Railroad Commission Districts 1, 2, 3, and 4, South Louisiana, Mississippi, Florida, Alabama, and Georgia. The search for new oil or gas pools increased in each one of these areas, except for the State of Mississippi, during the first 4 months of this year over the last 4 months of 1951. The success ratio has also increased 1.8 per cent over the last 4 months of last year. These figures include new pays in old established fields.

Texas Exploratory Drilling

Exploratory drilling was heaviest in the lower Texas Gulf Coast (District 3) where operators have drilled 165 wildcats this year. The success ratio was 20.6 per cent. Of these 165 wells, 22 established new oil pools and 12 proved gas pools. The expanding market for natural gas has spurred activity in this area, which has been proved to yield considerable gas. While none of the gas discoveries have been developed to a great extent, it is indicated that the area overlies a potentially large gas reserve.

Of particular importance in this region of Texas is the submerged drilling which is continuing at a rapid clip. Red Fish Bay, discovered 1 year ago off Nueces County, has yielded eight oil and gas reservoirs in the Frio formation. Drilling to the eastward in this area extended the field to within 1 mile of multipay Mustang Island field, and it is believed that common reservoirs exist in the two fields at certain pay levels.

Another important Frio strike in the Bay waters is West Fulton Beach field, Aransas County, which is located to the northwest of Fulton Beach. The discovery well logged over 100 ft. of possible net pay sand and the field is believed to be separated from Copano Bay and Fulton Beach fields by major faulting. Since the field's discovery, three other Frio sands have been established in the area by Sun Oil Co. and Phillips Petroleum Co.

Approximately 10 miles northeast of Lamar in Aransas County, Western Natural Gas Co. and Continental Oil Co. opened an oil and condensate field which produces from the Frio-Vicksburg. Development in the area has been slowed by the fact that it is a game reserve; however, two wells are currently drilling with locations staked for two more.

In the lower Texas coastal area, Hockleyensis production was established in Starr County at East Jones field. Subsequent drilling extended this field into Jim Hogg County, establishing a reservoir over a 3-mile linear distance. Over 30 oil wells have been drilled in the field since its discovery. The production in this field is relatively shallow; however, it is considered one of the most important reservoirs discovered in South Texas within the past year.

The search for natural gas spurred wildcatting in Brooks, Hidalgo, Starr, Jim Hogg, and Zapata counties. The fact that gas is found at such shallow depths in this area, plus the demand for gas, encourages drilling from an economic standpoint.

The deepest hole ever drilled in the State of Texas was drilled by Superior Oil Co. to a total depth of 17,966 ft. The venture was located in Portilla field, San Patricio County, and was plugged back and completed in the regular field pay.

Repairs Cost only $94.62

UNIVERSAL DRILLING CORPORATION

FRANK C. CARPENTER
Drilling Superintendent

Mr. H. W. Cardwell
Cardwell Mfg. Co.
P. O. Drawer 2001
Wichita, Kansas

Dear Mr. Cardwell:

Since we are nearing the end of our contract, I would like to give you some information which I am sure you will be very proud to hear.

We have drilled approximately 100,000 feet in 14 months with your two Model O's, and this work has been done under far from normal conditions. In every well we have had to drill, ream, and then underream with a Baker underreamer before setting a string of casing. This is of course a severe strain on clutches, chains, and every working part of a rig.

After checking our supplies, I find we have taken out of stock the amount equivalent to $94.62. Our drilling reports show a total loss of 3½ hours time, and this was caused by driller not keeping bolts tight in rotary clutch.

This is a very remarkable performance and certainly deserves commendation. Everyone that has seen these rigs remarks about how easy and simple they are to operate.

Hope to see you in June.

Sincerely yours,

Frank C. Carpenter

F. C. Carpenter, Drilling Supt.
Universal Drilling Corporation

on 100,000 Feet of Hole!

ONLY CARDWELL BUILDS A RIG THAT COMBINES FAST DRILLING WITH LOW MAINTENANCE AND REPAIR COSTS

COME TO CARDWELL AND SEE HOW IT'S DONE! At the Cardwell plant, you'll see the real reason for the low maintenance cost on Cardwell rigs. Before you invest in a draw works, come and see how these rigs are made with heat-treated wearing parts, and designed for ease of dismantling for repair or weight reduction in moving. You'll find a rig to fit your requirements at Cardwell.

FRANK C. CARPENTER
UNIVERSAL DRILLING CORP.

6,000- to 10,000-foot Model O draw works is available with two or three engines and with torque converters.

CARDWELL
REG. U. S. TRADE MARK PAT. OFFICE
THIS TRADE MARK INSURES HIGHEST QUALITY AT LOWEST PRICE

CARDWELL MFG. CO. INC.

P. O. Drawer 2001 . . . Long Distance Telephones 128—129—130
Cable Address: "ALL STEEL," Wichita — "CARDSTEEL," New York
Wichita, Kansas, U. S. A.

A deep wildcat in Cameron County, located almost at the very tip of Texas, had shows of gas at 13,708-26 ft.; however, the sands did not prove thick enough to produce commercially. If production had been established at this depth, it would have been the deepest producing well on the Texas Gulf Coast.

To the extreme west, veering away from the coastal plain into the "hill country," Strawn lime production was established in Val Verde County, which also established the first production in the county. Although subsequent drilling has not proved this a major gas reserve, wildcatting in the area picked up considerable after its discovery.

In the same general area, a wildcat in Bandera County created a great deal of interest when it was reported to have cored approximately 100 ft. of pay in the Pennsylvanian formation. This test was abandoned after shooting with nitroglycerin. While it did not produce, it is believed by speculators that this country will be still opened for production.

Wildcatting in the upper Texas Gulf Coast (Texas District 3) has been on the increase with 129 exploratory ventures having been completed the first 4 months of this year. Thirty-three of these established new oil production and six established gas production, resulting in a success ratio of 30.2 per cent. The average number of wells drilled is approximately that of the last 4 months of 1951 when 122 wildcats were drilled resulting in 29 oilers and 8 gas wells.

The search for deep production along the Wilcox belt, as well as for lower Frio production further coastward, highlights the activity in this area. An intensified effort has been made to develop this Wilcox trend, which starts approximately three counties from the shore line of the coast. Deeper drilling has proved these sands to be productive in both oil and condensate. Good pools have been established in Washington, Polk, Grimes, Lavaca, and Bee counties.

Operators continue to explore the flanks of old established fields in an effort to find good reserves. This reexamination has proved highly successful at Goose Creek, Hull, South Liberty, Batson, North Dayton, Sour Lake, Moss Bluff, and North Liberty.

The long-established Yegua trend has received a good play resulting in good discoveries. While none of these has been spectacular, Rankin field in Harris County has proved to be an important reservoir. Also in Harris County, Durkee field has been revived with two excellent Yegua sands being opened to yield oil.

TORSION BALANCE . . . This delicate instrument has been carefully set down in a virtually "inaccessible" location, via helicopter.

Edwards lime production is being sought in Atascosa, Wilson, Guadalupe, Caldwell, Bastrop, and Gonzales counties.

Louisiana Exploration

Exploratory drilling in South Louisiana did not result in any major discoveries. Wildcatting has maintained a rather steady pace with 61 wells being drilled this year as compared with 60 drilled the last 4 months of last year. Of these 60 wells, 14 have established oil or condensate pools.

Coquille Bay field in Plaquemines Parish has proved to be the most important strike in the area. The California Co., simultaneously completed two wells, located almost 2 miles apart, to open the field.

Pan American Production Co. discovered South Pecan Lake field in Cameron Parish, which produces both oil and gas. The same firm drilled 4 miles to the southwest of this field and established another oil-producing reservoir known as Little Pecan Lake field. Pan American owns leases and options on approximately 100,000 acres in the block.

In Washington Parish, Humble Oil & Refining Co. extended Sandy Hook gas field in Mississippi into Louisiana.

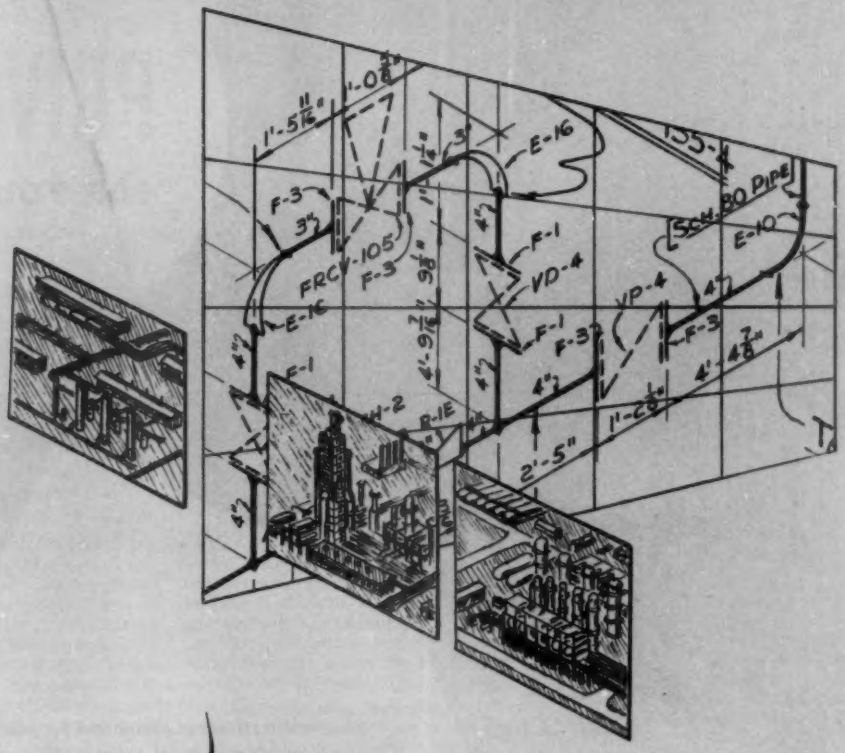
Mississippi Activities

Mississippi has had a decided decline in exploratory drilling during the first 4 months of this year, as compared with the last 4 months of 1951. Operators have drilled 58 wildcats this year, 7 of which proved oil discoveries and 1 a gas discovery. During the last 4 months of 1951, 80 exploratory wells were drilled, resulting in 10 oilers and 1 gas well. This noticeable decline is rather surprising inasmuch as the success ratio of the wells has been good.

Bulk of the exploration in Mississippi centers around the southwestern portion of the state in Adams, Franklin, Wilkinson, and Jefferson counties, which have yielded good Wilcox pools. A new pay in Baxterville field, located in Lamar and Marion counties, last year extended 90 miles eastward the area of possible Wilcox production in the state.

The search for Smackover production has gained impetus within the last few months. Possibilities of production from this formation have been of great concern to the industry since oil was first discovered in the state.

First production from this formation has been established on the west flank of Tinsley field, Yazoo County. The well flowed gas and condensate from 13,985-14,170 ft. in a third sidetracked hole. The gas had a very high sulfur content, and unconfirmed re-



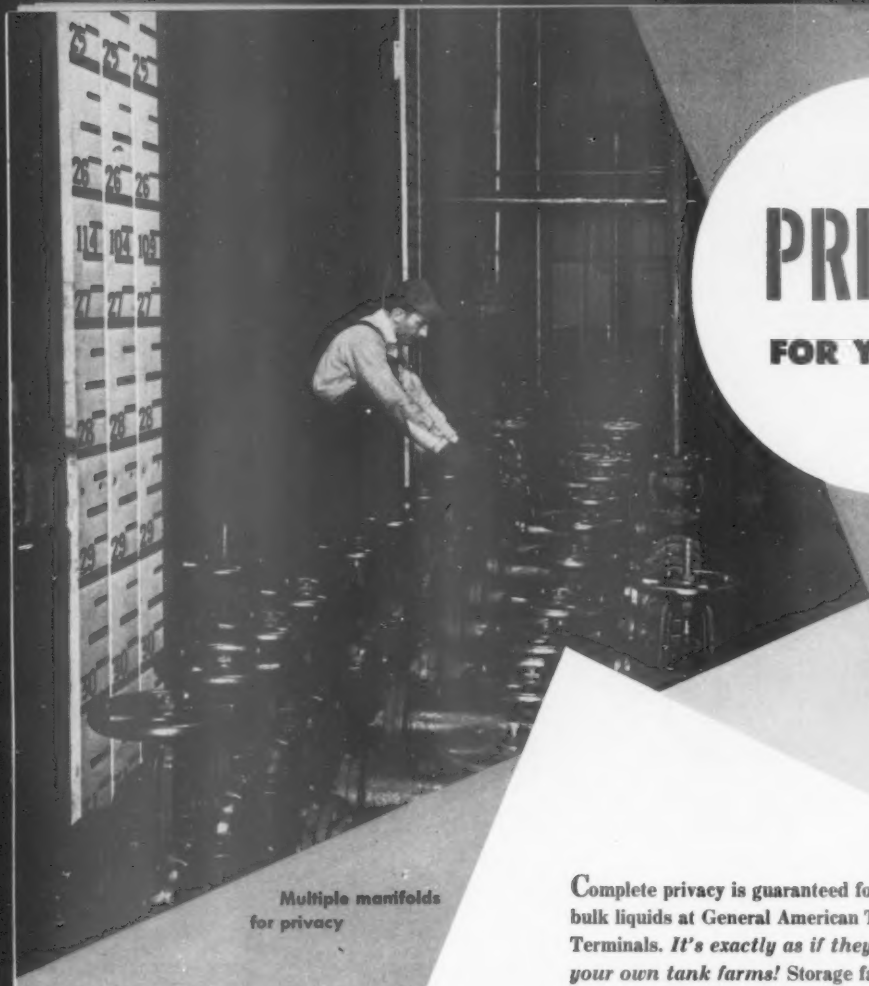
all phases

HYDROCARBON PROCESSING
PETROCHEMICAL PLANTS
OIL REFINERIES
NATURAL GAS PLANTS

PROCESS, PROJECT, and CONSTRUCTION ENGINEERING

4617 COLE AVE. • DALLAS, TEXAS

THE MARK OF A JOB WELL DONE



Multiple manifolds for privacy

PRIVATE

FOR YOU ONLY

Complete privacy is guaranteed for your bulk liquids at General American Tank Storage Terminals. *It's exactly as if they were your own tank farms!* Storage facilities, pipelines and closely guarded manifolds (designed to protect against contamination) are yours to use. *At Carteret and Goodhope terminals your bulk liquids can be blended to specification; canned, drummed or barrelled for distribution. All this without investing or risking your capital!*

5 TANK STORAGE TERMINALS

Important marketing centers

- Port of New York (Carteret, N. J.)
- Port of New Orleans (Goodhope, La.)
- Chicago
- Houston
- Corpus Christi

GENERAL AMERICAN TANK STORAGE TERMINALS

A Division of General American Transportation Corporation

135 South La Salle Street • Chicago 90, Illinois

WORLD'S LARGEST PUBLIC TANK STORAGE SYSTEM

OVER-WATER EXPLORATION . . . This Shell photo shows type of boats used in seismographing in Gulf of Mexico.

ports place the content at more than 3,600 lb. per million cubic feet of gas.

Another closely watched Smackover wildcat during the past year was in Madison County. The well, Continental Oil Co. 1 John R. Cameron, had shows of gas at 13,783-13,970 ft., but it proved to be predominantly carbon dioxide with high sulfur content. Operator plugged back and completed the venture in the Hosston gravel.

One of the most interesting ventures searching for Smackover production is Lion Oil Co. 2 Denkmann; 22-7s-4e, Rankin County, which has 7-in. casing cemented at 15,088 ft. A sand section immediately below the casing has been drill-stem tested with recovery being noninflammable gas. A solid sand section has been cored from 15,997 ft. to total depth of 16,200 ft. Just what the sand contains is unknown; however, the top 90 ft. was porous and permeable. Many observers believe the sand contains gas or salt water.

Probably the most important exploratory venture in the state is a test in Monroe County, which revived interest in possible production from Paleozoic rocks. Northeast Mississippi Oil Co. undertook to rework an old well abandoned in 1941, which seeped gas after abandonment. Prompted by the gas seepage, Northeast Mississippi Oil Co. entered the well and cleaned out to the base of a cement plug at approximately 2,900 ft. At this depth, the well blew out of control and flowed gas at an estimated rate of 60,000,000 cu. ft. daily. After flowing wild for over a month, the well was killed with 15½-lb. mud.

Union Producing Co. purchased a one-half interest in the well and the surrounding 12,000 acres and took over operations. Hole was cleaned out to 5,274 ft., and casing cemented at 5,186 ft. The well was completed for 35,000,000 cu. ft. of gas daily with rock pressure of 2,003 psi. Formation from which the well is producing has not been determined, and could be any one of the Mississippian exposed in the open hole.

"IN-WATER" EXPLORATION . . . This is seismic party 18, Lake Maurapas. Shell photo.

Alabama Exploration

Alabama is credited with the most exciting discovery in the Gulf Coast this year. Humble 1 Moye, discovery well at Pollard field, Escambia County, created a leasing play throughout the area that was reminiscent of boom days. The well was completed in the lower Tuscaloosa formation for 324 bbl. of 30°-gravity oil daily, which is by far the best well ever completed in the state. Approximately 25 ft. of saturated sand was cored in the well.

Drilling of this well followed close on the heels of a wildcat drilled by Stanolind Oil & Gas Co., located 1½ miles west and one location north, which had approximately 6 ft. of saturation in the same zone. Extensive testing in the Stanolind well proved fruitless, and operators abanoned the venture.

Discovery of this pool establishes production the farthest east in the state. It is 40 miles east of production at Gilbertown field, Choctaw County. On the basis of its discovery, a fantastic leasing boom was set off in Escambia and Covington counties, Alabama, and Santa Rosa, Escambia and Okalossa counties, Florida.

Wildcatting in Florida has hit a new low with only two wells being drilled in 1951 and one well this year. None of these proved productive. Continental Oil Co. has recently leased approximately 1,000,000 acres in the state, and plans an extensive exploration campaign.

Georgia failed to have a single exploratory venture drilled within its borders during the past year. In an effort to stimulate wildcatting, the State of Georgia has offered a $100,000 bonus to the operator of the first 200-bbl. per day well.

PRODUCTS PIPE LINE . . . Photo of terrain as encountered during construction, for a major products carrier on route through Gulf Coast to northeastern markets.

The Gulf Coast *TODAY . . .*

Two New Crude Lines to Have Half-Million-Barrel Capacity

F. Lawrence Resen

TWO major pipe lines which will carry West Texas crude into the major Gulf Coast refining areas are the major projects in current pipe-line expansions which will affect the coastal regions of Texas and Louisiana. Both lines are due for completion in late 1952, and their combined cost of $81,300,000 will provide capacity for the transportation of 510,000 bbl. of crude daily.

The lines will end a bottleneck between the Gulf Coast and West Texas which has seen stocks increase in the high production areas while Gulf Coast refiners were encountering tight crude supplies at various times throughout the year.

West Texas Gulf Pipe Line Co. has scheduled its 471-mile, 301,000-bbl. per day line for completion in October. The $37,900,000 project consists of a 26-in. line from Colorado City, Mitchell County, to Wortham in Freestone County, and a 24-in. line from Wortham to Sour Lake, Hardin County, near Beaumont. Gulf Oil Corp. is owner of more than 50 per cent of the project, while other participants are Sun Oil Co., Standard Oil Co. (Ohio), Pure Oil Co., and Cities Service Oil Co.

A 20-inch line running 114 miles from Wortham to connect with Mid-Valley crude line at Longview is also under construction as a separate project, also due for completion in October. The Mid-Valley line is operated jointly by Sun and Sohio and runs to Lima, Ohio.

Also tied indirectly to the West Texas line is the 150,000-bbl. 18-in. line being built between Sour Lake and Lake Charles, La., by Cities Service Pipe Line Co. When the 64-mile link is completed in the beginning of 1953, it will transship crude from the Sour Lake terminus of the West Texas line to Cities Service Refining Corp.'s 150,000-bbl. refinery at Lake Charles.

The other major project, the Rancho Pipe Line System, will run from McCamey in the Permian basin of West Texas, to Houston, a distance of 463 miles. It is scheduled for completion late in this year. The 24-in. line will cost $41,600,000 and have a daily capacity of 209,000 bbl. It is a multiple-ownership undertaking of Shell Pipe Line Corp., Sinclair Pipe Line Co., Pan American Pipe Line Co., Tidewater Pipe Line Co., Nantucket Pipe Line Co., Ashland Pipe Line Co., and Phillips Pipe Line Co.

The move to bring more crude into the Gulf Coast refining area is being furthered by Texas Pipe Line Co. which has a 175-mile, 16-in. line being laid from Corsicana in East Texas to Houston. The line, which will have a capacity of 60,000 bbl. daily and cost $7,900,000, is scheduled for completion early this summer.

Texas Pipe Line Co. also has a $18,700,000 program under way which will improve crude-oil distribution along the Louisiana Gulf Coast. These projects when completed will have a combined capacity of 167,000 bbl. per day. The longest stretch in the program will be a 220-mile, 22-in. line which will go from Port Arthur to Houma, La.

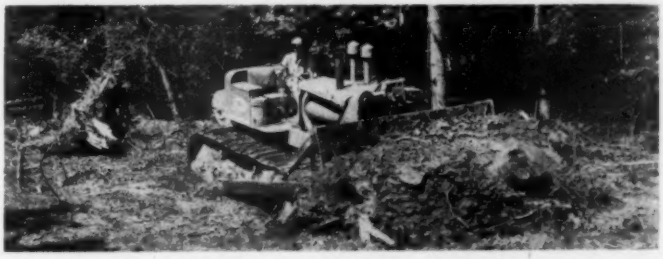
The Louisiana area is due for an-

other series of projects of Interstate Oil Pipe Line Co., which are intended to improve crude-oil gathering and distribution systems. Four separate programs totaling more than $16,400,000 are under way in the coastal state. A 22,000-bbl. per day line, consisting of 102 miles of 4 and 16-in. pipe, will be laid from coastal Louisiana to Baton Rouge. The same size pipe will be laid for 126 miles in southwestern Louisiana to provide 35,000 bbl. per day capacity. A 33-mile 20-in. line will be laid from Melville to Bunkie with a capacity of 107,000 bbl. and a 12 and 16-in. line will be laid 63 miles from Flora to Bunkie, also with a capacity of 107,000 bbl.

Humble Pipe Line Co. has an $8,100,000 project under way to bring East Texas crude from Hawkins to the Baytown refinery of Humble Oil & Refining Co. The 201-mile project will consist of 12 and 18-in. lines and will have a capacity of 66,000 bbl. daily.

An unusual steam-heated line has been installed in southern Mississippi and Alabama by Gulf Refining Co. The 152-mile line uses intermittent pumping and heating stations to maintain heavy crude in a viscous condition so as to flow freely to the Mobile terminal. A 10-in. section runs from Eucutta to Lumberton, Miss., and a 14-in. section runs on to Mobile.

Continental Pipe Line Co. has a 105-mile, 8-in. line being laid from Rincon field, Starr County, to Port Isabel. The 34,000-bbl. line is due for completion in the fall. Phillips Petroleum Co. is laying a 27-mile line from its Sweeny refinery to Freeport. The 12-in. line will have a capacity of 115,000 bbl. of crude daily.



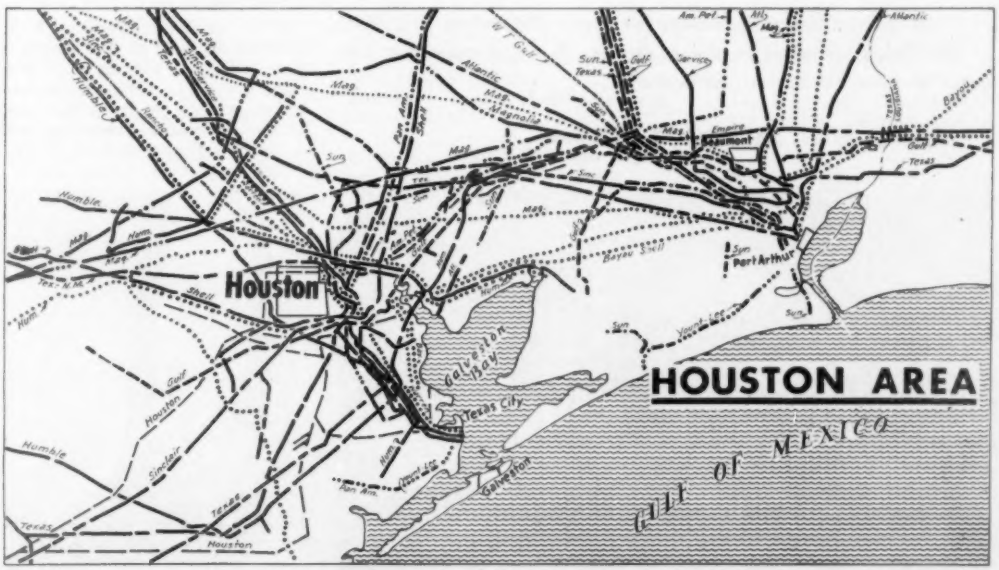
Site clearing operation on a new Gulf Coast crude-line project.

Products Line

The most ambitious products-line program suggested for the Gulf Coast is a 14-16-in. line which has been proposed to run between Beaumont, Tex., and Newark, N. J. United States Pipe Line Co. has received Petroleum Administration for Defense approval for its project and is scheduled to receive priorities assistance once the company has established its financial status to the satisfaction of PAD. It has until July 15 to make its presentation. The products carrier would be 16-in. from Beaumont to Cincinnati and then 14-in. from Cincinnati on to its New Jersey terminus.

Plantation Pipe Line Co. completed its 432-mile 18-in. products line running from Baton Rouge to Bremen, Ga. Plans call for the building of additional facilities under a gradual program which will give the line a 200,000 bbl. capacity by 1960.

A proposed products pipe line is planned by Coastal Products Pipe Line Co. from Houston to Baton Rouge. The line would be a 20-in., 260-mile venture. Texas Pipe Line Co. and Gulf interests have proposed to build a big-inch products line from the Beaumont-Port Arthur area to Baton Rouge. Sinclair interests have considered building a line from Houston to connect with it at the Beaumont-Port Arthur area.



JOURNAL MAP OF GULF COAST PIPE LINES . . . The dotted routes denote products pipe lines; dashed and solid routes are crude-oil systems.

AERIAL VIEW of California Co. camp at Venice, La. (Fig. 1).

PICTURE TOUR . . .

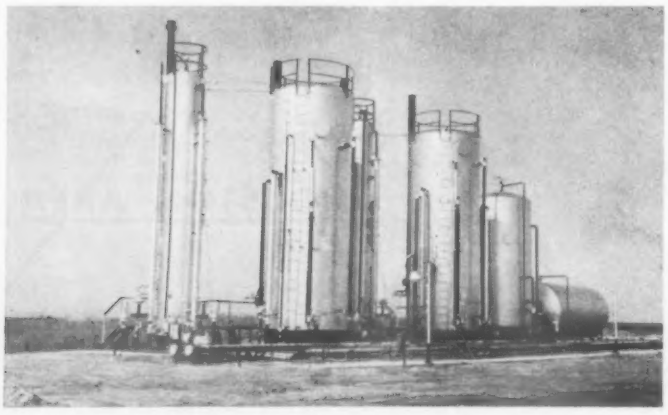
A Day in the Mississippi Delta Fields of The California Co. . . .

The terrain situation makes for some interesting problems in the fields pictured in these pages. But the operator has risen to every occasion, as witness . . .

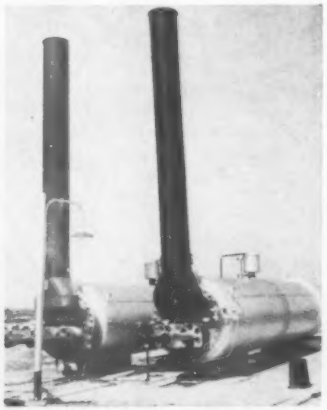
by Earl W. Harter

THE CALIFORNIA CO., with headquarters in New Orleans, is a major producer of oil in South Louisiana. It currently produces more than half of the oil in the so-called offshore tidelands areas. Much of its other production comes from fields located in the marshes, swamps, and bays of Jefferson and Plaquemines parishes south of New Orleans.

All in all, The California Co. accounts for about 10 per cent of the total South Louisiana production of more than a half million barrels daily. About 85 per cent of the company's South Louisiana production comes from fields in the New Orleans district. Table 1



HEATER-TREATER installations in Romere Pass field (Fig. 2).



LINE HEATERS for high-pressure oil (Fig. 3).

TABLE 1 — CALIFORNIA COMPANY'S SOUTH LOUISIANA FIELDS

	Current allowable, B/D	Total gas prod., M.c.f./ month
Plaquemines Parish—		
Alliance	62	11,467
Bayou de Fleur	1,455	33,745
Bay Coquille	1,058	63,722
Grand Bay	144	2,965
Quarantine Bay	209	2,271
Romere Pass	9,016	174,051
Stella	578	13,869
Jefferson Parish—		
Barataria	5,139	141,493
Barataria, West	3,374	119,553
Bayou Perot	1,341	82,516
Delta Farms	14,288	700,245
St. Martin Parish—		
St. Martinville	310	34,144
Plumb Bob	165	3,260
Calcasieu Parish—		
English Bayou	81	
Tidelands (Offshore)—		
Bay Marchand	6,234	117,789
Main Pass Block 69	4,776	94,551

lists these fields, together with other pertinent facts.

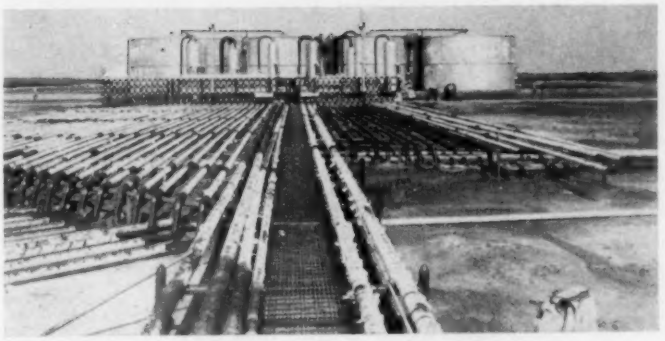
Gas production as listed in Table 1 is for the most part casing-head gas. While the terrain problem of building pipe lines and field compressor stations has forced operators in South Louisiana to flare casing-head gas in the past, more than 85 per cent of the current gas flaring by The California Co. will cease by mid-1953, when present plans for pipe-line and compressor station construction are completed.

Exploration, drilling, and operations in South Louisiana are quite interesting due to the terrain problem. The pictures which illustrate this article are what can be seen in a day's time, viewing the multiple operations of a large company, such as The California Co.

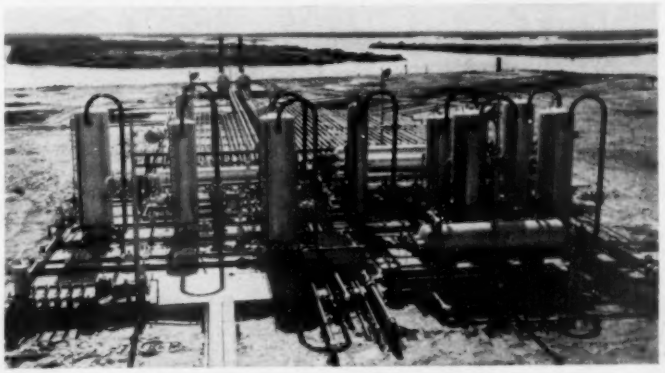
Company camp . . . An aerial view of the large California Co. camp at Venice, La., is shown in Fig. 1. In the foreground is one of the passes of the Mississippi River; other waterways are canals. This camp provides housing and office accommodations for about 100 employes engaged in drilling and production operations in the Mississippi delta (Plaquemines Parish) fields. Boat docks and seaplane landing facilities are also provided.

Treating . . . One of the major heater-treater installations in the Romere Pass field is shown in Fig. 2. The two sets of units are for handling the production from two separate sands (producing at different pressures). Note the guy wires to stabilize the units against hurricane winds. To the right is seen a water settling chamber and filter which is part of the salt-water-disposal system.

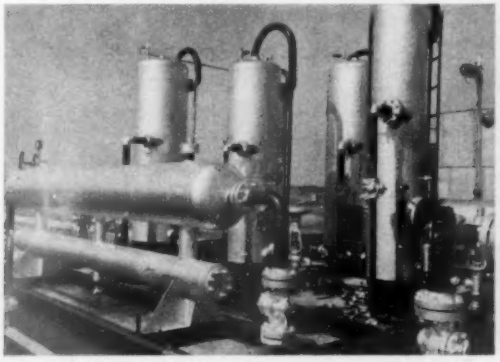
Romere Pass field is in the center of a United States wildlife preserve, and



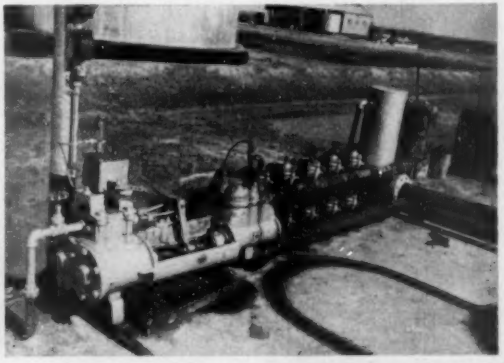
GATHERING LINES for 40 wells in Romere Pass field (Fig. 4).



FLOW LINES and separators at Romere Pass (Fig. 5).



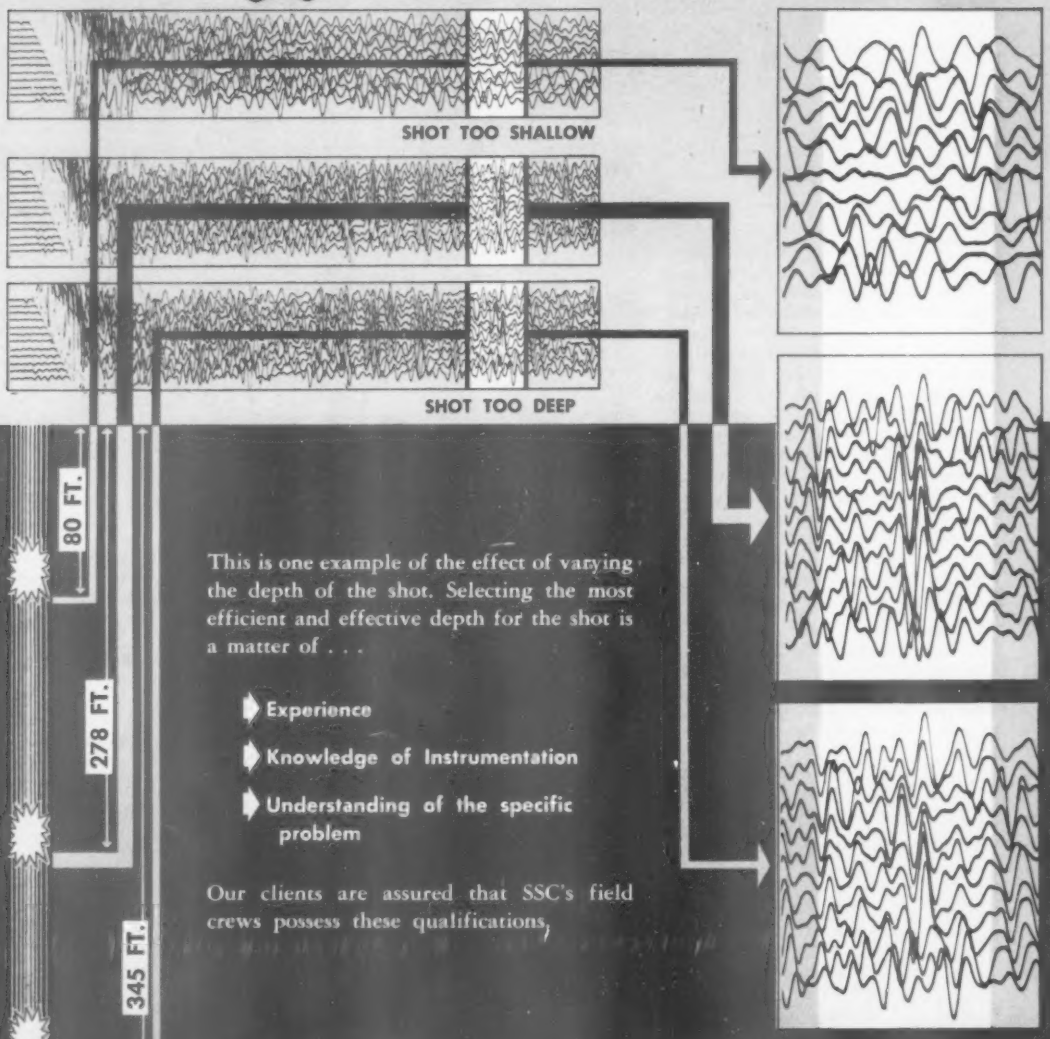
HIGH-PRESSURE SEPARATORS at Romere Pass field (Fig. 6).



UTILITY STEAM PUMP used for a variety of applications (Fig. 7).

Basic Methods for Improving Seismic Records . . .

The Effect ...of DEPTH of SHOT



This is one example of the effect of varying the depth of the shot. Selecting the most efficient and effective depth for the shot is a matter of . . .

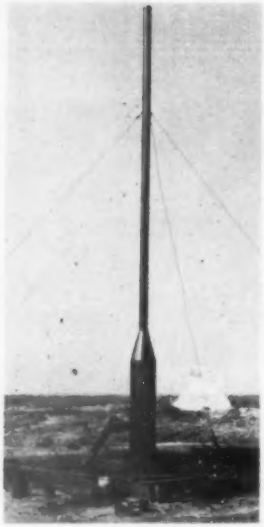
- Experience
- Knowledge of Instrumentation
- Understanding of the specific problem

Our clients are assured that SSC's field crews possess these qualifications.

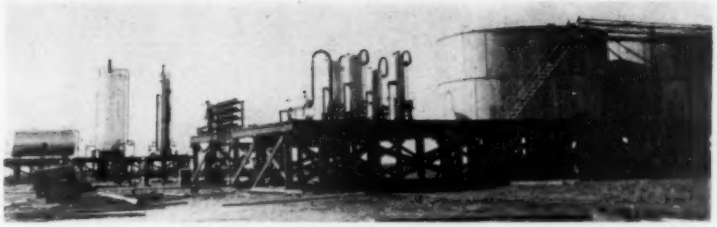
Seismograph Service Corporation

Seismic Surveys – Gravity Surveys – Pilot Crews – Lorac

TULSA 1, OKLAHOMA, U.S.A.



GAS FLARE at Romere Pass field (Fig. 8).



TANK BATTERY at Bay Coquille field (Fig. 9).

DRILLING PREPARATIONS at Bird Island prospect (Fig. 11).

WILDCAT WELL at Battledore Reef field (Fig. 10).

OYSTER SHELL being deposited over drilling site (Fig. 12).

therefore salt-water production cannot be diverted into the river because of the possibility of contamination. One salt-water-disposal well is located behind the heater-treaters (not seen in the picture), and it takes 1,200 bbl. daily in a 2,000-ft. sand by gravity.

About 10 per cent of the Romere Pass wells make water as compared to 1-2 per cent a year ago. A closed system is utilized for the salt-water injection to avoid the necessity of treatment.

Oil heaters . . . Fig. 3 shows a view of two line heaters for oil from high-pressure wells in Romere Pass field coming into the headers. Their purpose is to effect a better oil and gas separation, since foaming is minimized when the oil temperature is at an optimum temperature.

All the installations shown in Figs. 2 to 8 are located on an island centrally located with respect to the wells in Romere Pass field. Also located on the island (but not shown in the picture), are office and housing facilities for 50 men.

Gathering . . . A view of the gathering lines which bring the production of some 40 Romere Pass wells into the header and separators, is shown in Fig. 4. In the background are seen the storage tanks. It will be noticed that there are two parallel systems here—one for each of the two major producing sands. The production from these two sands goes separately through different headers and separators and into separate storage tanks. To the left of the left storage tank, the gas flare can be seen in the background.

Flow lines . . . In Fig. 5 is shown a view of the Romere Pass flow lines and separators from another direction. The line heaters described in Fig. 3 are seen in the far background. High-pressure wells go through two separators.

Different separators are provided for low-pressure wells depending on whether the oil is clean or contains some water. An additional high-low pressure separator is provided for testing the potential of individual wells. The horizontal tank in the right foreground is a stripper, which removes condensate before the gas goes to the flare.

Separators . . . A closer view of the separators in Romere Pass field is shown in Fig. 6. Note the high-pressure vertical separators. All units are National. Because of the weight of these units and their firm connection to the piping, no guy lines are provided for stabilization in hurricane winds.

Utility pump . . . A utility stream pump (shown in Fig. 7) has the following functions:

1. Filling empty storage tanks with canal water when high wind velocities are encountered, as in hurricanes. The storage tanks are not provided with guy wires, since they are adequately stabilized when filled with liquid.

2. Recirculating crude oil from storage tank, through the emulsion treaters, and then to storage, as needed.

3. Filling the treaters with canal water.

4. Pumping fluid to the pits.

5. Circulation of special water brought to Romere Pass field by barge.

Seen to the right in Fig. 7 is the

MIDWINTER MUD—and cold—mean nothing to this International TD-18A, working year 'round for Illinois oil producers and drilling contractors.

"This Crawler Built My Business"

HIS OWN BOSS is owner-operator Grady Marchman, whose all-round all-work choice among crawlers is his rugged International.

TD-18A pays off big for Illinois oil field contractor

Grady Marchman, Vandalia, Illinois, specializes in oil field preparation work. With his rugged International TD-18A crawler, he levels new locations, digs slush pits, moves mud sleds, spots drill rigs and spudders, and does it all *fast*.

"These Internationals are really built for oil field work," says Marchman. *"They have power and speed to do a fast, clean job in any weather. This reliability has sure helped me build my business!"*

Ask your International Industrial Distributor for the low-down on how reliable fast-working International power can help *your* business. Ask him today!

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

INTERNATIONAL INTERNATIONAL HARVESTER **POWER THAT PAYS**

manifold which is used when the function of the utility pump is to be changed. The pump has a capacity of 8 bbl. per minute.

Gas flare . . , The gas flare at Romere Pass field is shown in Fig. 8. In the foreground is a 30-ft. stack through which unignited gas is vented during the night. The reason for this unusual arrangement is the fact that Romere Pass is located in the middle of a U. S. wildlife preserve, and it is considered a hazard (especially to birds) to have an open flame after dark.

Blowing large quantities of unburned gas into the atmosphere is not without precedent, however, for during the last war all lighted flares were ordered extinguished in the lower Mississippi Delta region. Wild life also imposes restrictions on drilling operations, and during certain seasons of the year drilling is limited to one well at a time.

Tank battery . . . Fig. 9 shows the location of equipment on the Bay Coquille field tank battery. The platform in the background holds the heater-treaters and the bunk house (not shown). The platform in the foreground holds the separators and the storage tanks.

These platforms are supported by piling 12 ft. above the island ground level which in turn is 2 ft. above the mean water level. However, during periods of high tides and during hurricane storms the island is covered, necessitating the positioning of equipment above the highest tide levels anticipated.

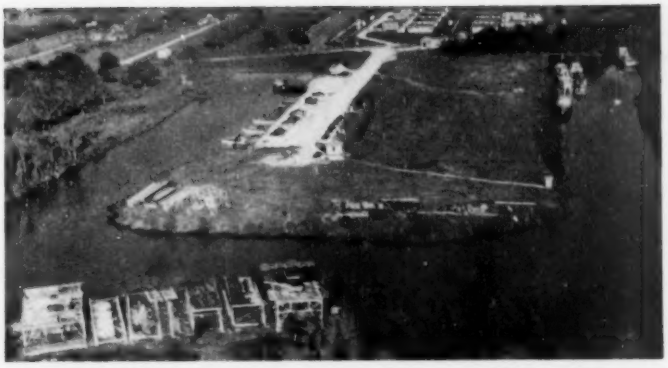
Bay Coquille field now has 10 producing wells.

Wildcat . . . A drilling wildcat well (Fig. 10) in The California Co.'s Battledore Reef field is located 5 miles east of Bay Coquille field. The well is in open, shallow Breton Sound (Gulf of Mexico) waters. A submersible drilling barge is being used. During the drilling of this well 7 to 8-ft. waves were experienced, and the barge was moved about 3 ft., however, without serious damage to the drilling operations.

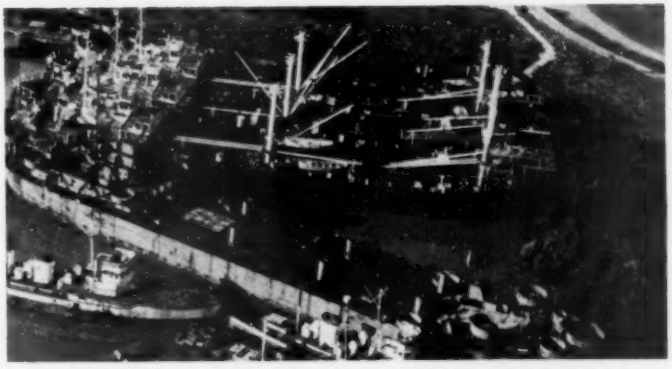
Operations of this sort may be considered the most severe tests to which submersible drilling barges have yet been subjected. Special anchoring of the barge is required, and, in general, the barge is oriented in the direction of the prevailing winds and tides.

Drilling preparations . . . A view of the preparations being made before drilling The California Co.'s Bird Island prospect, near Bay Coquille field, is shown in Fig. 11. The water is too deep for a submersible drilling barge, and still not deep enough to move in the deep-water drilling equipment used in tidelands drilling.

This illustrates the manner in which a floor of the gulf is raised to a height where a submersible drilling barge can be moved in. Shown to the left is a tug holding the oyster-shell barge in position. The middle barge holds the crane scoop. To the right are the pilings to which the submersible drilling barge will be moored.



CALIFORNIA CAMP in Barataria area of Jefferson Parish (Fig. 13).



L.S.T. DRILLING BARGES await resumption of offshore operations (Fig. 14).

Oyster shell is being transferred from the barge and dropped over the drilling site location as shown in Fig. 12. By lowering the scoop in the water on occasion, markers on the cable holding the scoop will show the height of the oyster island.

Barataria camp . . . Another California Co. camp is located in the Barataria area of Jefferson Parish (Fig. 13). Shown in the foreground are some drilling jacks, which when the picture was taken (January 1952) were in storage due to the diminished tidelands drilling.

In the slip to the right are seen some of the larger boats (converted air-sea rescue boats, used primarily by U. S. Air Force) used in tidelands drilling and production work. Houses and offices are seen in the background.

Barges . . . Converted and unconverted L.S.T. drilling barges are shown in storage off the Harvey Canal, awaiting reactivation of tidelands drilling (Fig. 14). Most of these boats are owned by The California Co., which at the present time is the major producer of tidelands oil.

THE AUTHOR

Earl W. Harter is lead petroleum engineer in the Venice, La., area Gulf Coast division, of The California Co. He joined the company in 1946. Harter was employed by Van Keuren Co. and Stanolind Oil & Gas Co. prior to his association with The California Co. He served in World War II as a captain in the army. Harder holds B.S. degree in petroleum engineering from Pennsylvania State College.

TANK BATTERY NO. 2 of Gulf Refining Co., at Quarantine Bay, La. Gulf operates 7 of this design in this area (Fig. 1).

SUBMERSIBLE BARGE in Black Bay field. The barge contains 6 storage compartments, totaling 4,800 bbl. of storage (Fig. 2).

ORIGINAL SINKING of submersible barge in Black Bay field (Fig. 3).

An appraisal of

Production Problems in Water Areas in South Louisiana . . .

FIFTEEN years ago Gulf had no problems in South Louisiana, but produced no oil. Now there are problems, but in conjunction with these problems Gulf is producing 43,000 bbl. of oil a day.

In order to better understand these problems and to present data which will, in many instances, be of correlative engineering value, a brief introduction as to magnitude, location, and type of operation is necessary.

Gulf Refining Co.'s Gulf Production Division operations in South Louisiana covers an area from Texas to Mississippi, and as far north in Louisiana as Alexandria. The zone office is located in Harvey, La., immediately across the Mississippi River from New Orleans.

In this zone, Gulf operations include 19 producing oil fields, 5 producing gas fields, and 5 nonproducing fields shut in while awaiting a gas market or remedial work on the wells.

The daily allowable for Zone 1, South Louisiana, was 42,412 bbl. on September 1, 1951. There were 319 producing oil and condensate wells. The allowables in Louisiana are a factor of depth; for example, a well completed between 7,000 and 8,000 ft. has an allowable of 235 bbl.; 8,000 to 9,000 ft., 263 bbl.; 9,000 to 10,000 ft., 301 bbl. Wells completed below 15,000 ft. are assigned an allowable of 613 bbl.

In this zone, 50 per cent of the Gulf wells are in marshy areas, 25 per cent in bay areas, and 25 per cent on land. The higher the precentage of wells in the water and in the marshes, the higher the cost of production. Approximately 82 per cent of the wells are flowing, and 18 per cent are being artificially lifted.

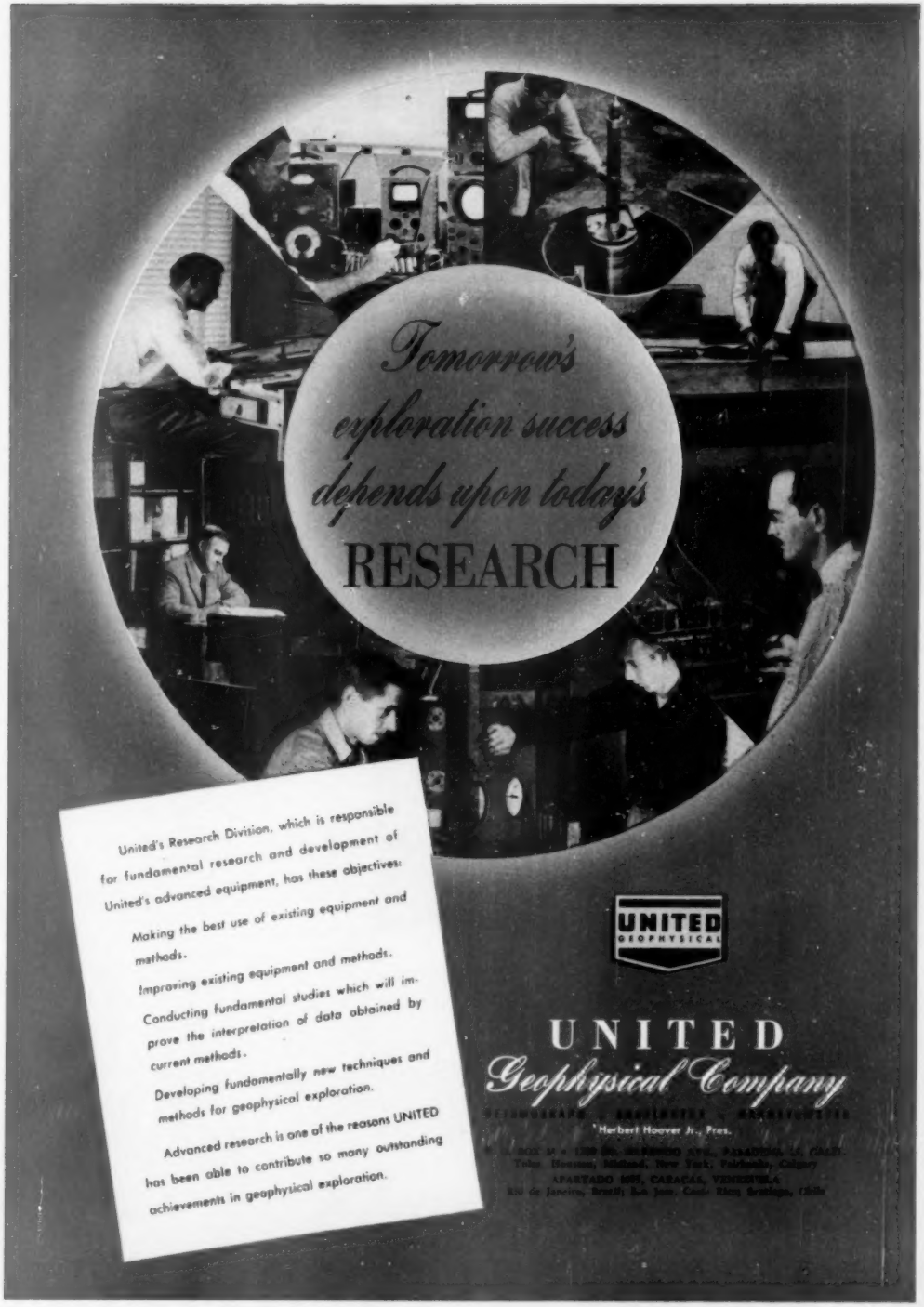
To give an idea of the operations in progress, Gulf now has 6 company barge-drilling rigs, 10 contract-drilling rigs, and 1 workover rig. To operate these properties, there are required 79 exempt and 441 nonexempt personnel, totaling 520 employes. The major fields are Quarantine Bay, which has a daily allowable of 11,296 bbl.; Grand Bay, a daily allowable of 10,123 bbl., and West Bay, a daily allowable of 9,020 bbl.

Storage Equipment

Providing storage for oil in marshy and bay areas presents many problems; more of which have not been than have been solved. The high costs for these installations are evidence that this is so.

Piling-type tank battery . . . Fig. 1 shows Gulf's Louisiana State "QQ"

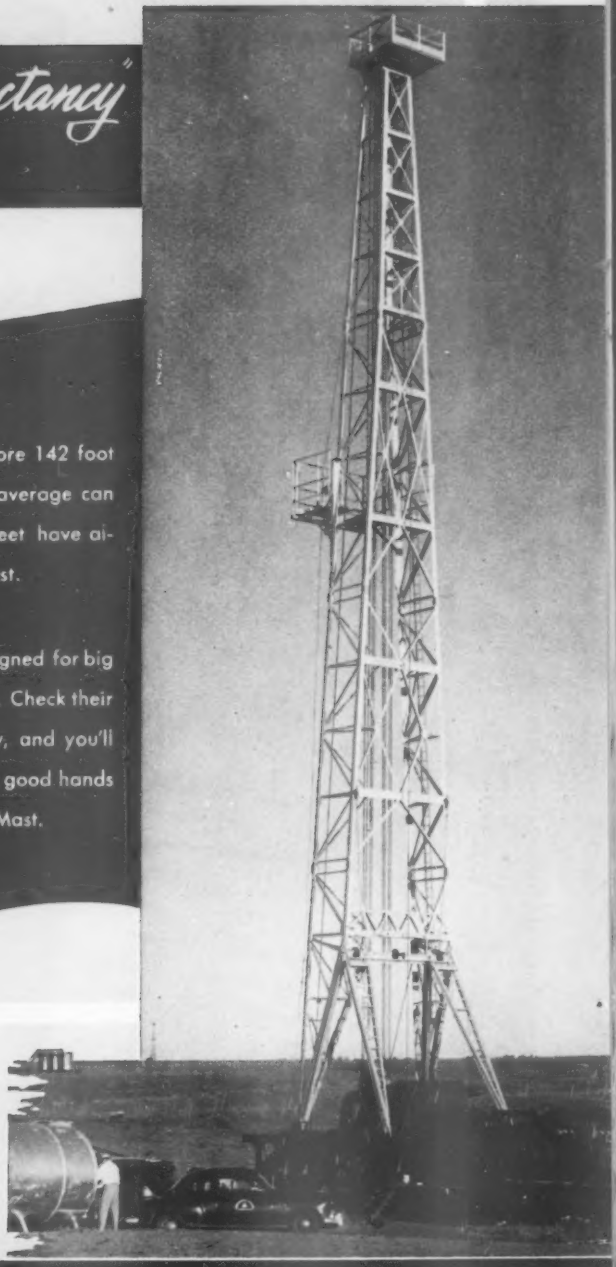
. . . by H. L. Scott


Tomorrow's exploration success depends upon today's
RESEARCH
United's Research Division, which is responsible for fundamental research and development of United's advanced equipment, has these objectives:
Making the best use of existing equipment and methods.
Improving existing equipment and methods.
Conducting fundamental studies which will improve the interpretation of data obtained by current methods.
Developing fundamentally new techniques and methods for geophysical exploration.
Advanced research is one of the reasons UNITED has been able to contribute so many outstanding achievements in geophysical exploration.
UNITED
GEOPHYSICAL
UNITED
Geophysical Company
Herbert Hoover Jr., Pres.
APARTADO 1071, CARACAS, VENEZUELA

WHAT IS THE "Depth Expectancy" OF A LEE C. Moore 142 FOOT MAST?

Experience in drilling with a Moore 142 foot mast shows that depths far below average can be reached. Wells below 15,500 feet have already been drilled with this big mast.

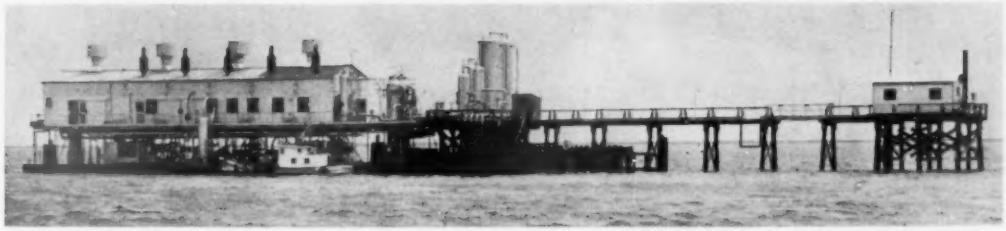
Lee C. Moore Big Masts are designed for big jobs. So far no job has been too big. Check their strength, ruggedness and durability, and you'll see why the toughest drilling job is in good hands when you use a Lee C. Moore Big Mast.



LEE C. MOORE CORPORATION

TULSA • DALLAS • HOUSTON • MIDLAND • SHREVEPORT • WICHITA • CENTRALIA • PITTSBURGH

Export Office — Room 624, International Bldg., 630 Fifth Ave., New York 20, N. Y.



ONE OF THREE barge-type compressor stations and dehydrator plants installed by Gulf in the bay fields of South Louisiana (Fig. 4).

Tank Battery No. 2 at Quarantine Bay, constructed in 1941. This type of tank battery was the first answer to the storage problem in bay areas and is an excellent example of sound engineering and good judgment. The platform is 62 by 120 ft. and has an impervious deck equipped with gutters.

On this platform are mounted six 1,000-bbl. tanks, four separators, and one 750-bbl. gun-barrel tank. There is a 150-ft. walkway to the heater platform. A pumper's house is provided with each of the larger tank batteries such as this one.

In Quarantine Bay there are four batteries of this design and three more of similar design but of smaller capacity, making a total of seven piling-type tank batteries.

The primary disadvantage of this type of storage is that it cannot be moved economically if a change of location is desired.

Tank-battery barge . . . For marshy areas and somewhat protected waters, a more economical type storage is a tank - battery barge. The most recent tank - battery barge installation was made at Grand Bay in 1949. The barge is 110 by 34 by 10 ft. and has a capacity of 6,000 bbl. distributed in its six 1,000-bbl. compartments.

The main advantage of this type of storage is mobility. If a more desirable location develops for this barge as the field area increases it may be moved. The cost for such a move is determined by the length of time the barge has been installed, the number of wells producing into the barge, the amount of dredging required, etc. These barges are well equipped and offer very flexible operations.

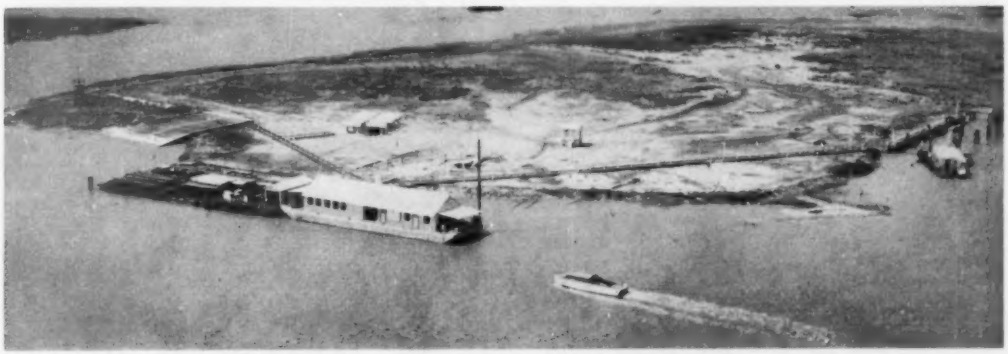
Concrete platform tank battery . . . A more recent development is the concrete platform foundation for storage tanks and other equipment. The first concrete platform installed was by Gulf in Quarantine Bay. This type of platform has some very excellent features: (1) 100 per cent salvability; (2) low maintenance cost; (3) availability of material, insuring an early delivery date.

Submersible tank-battery barge . . . Fig. 2 shows barge of this type now in operation in Black Bay field, Louisiana. It was developed for operations where few or no field data were available from which a site or location for a battery could be selected. The upper or storage section is 72 by 52 by 8 ft., and the lower or submersible section is 80 by 52 by 5 ft. There are six 800-bbl. compartments, or 4,800 bbl. of storage. The equipment on the deck of the barge is very similar to that on the smaller tank-battery barges used in protected waters.

Oil gravitates from this barge to oil-transportation barges at a rate of 1,200 bbl. per hour.

Like a barge-type battery, this barge can be raised and moved if necessary, to a more centrally located site. This is accomplished by injecting air into the lower section, which consists of four compartments. The air is directed into two end compartments, forcing the water out of these compartments and thereby raising that end

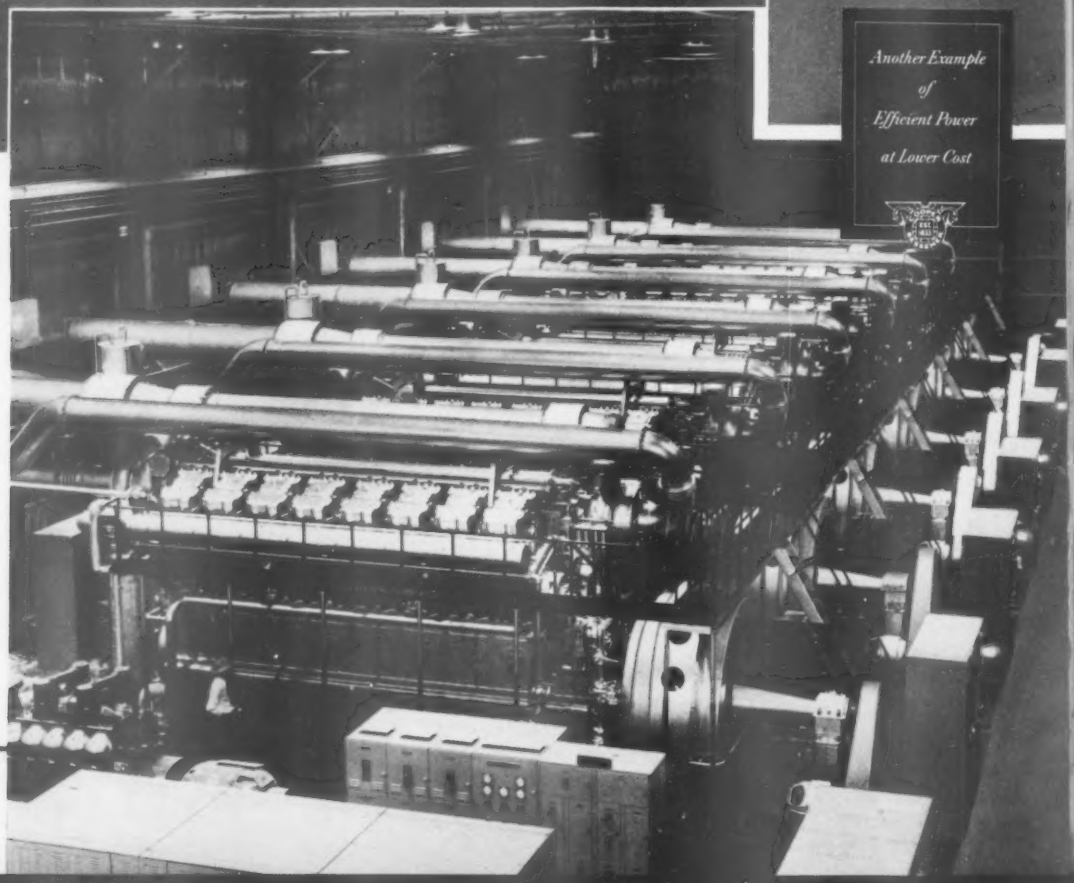
ROUSTABOUT WORK BARGE serves the purpose of a water-borne lease truck (Fig. 5).

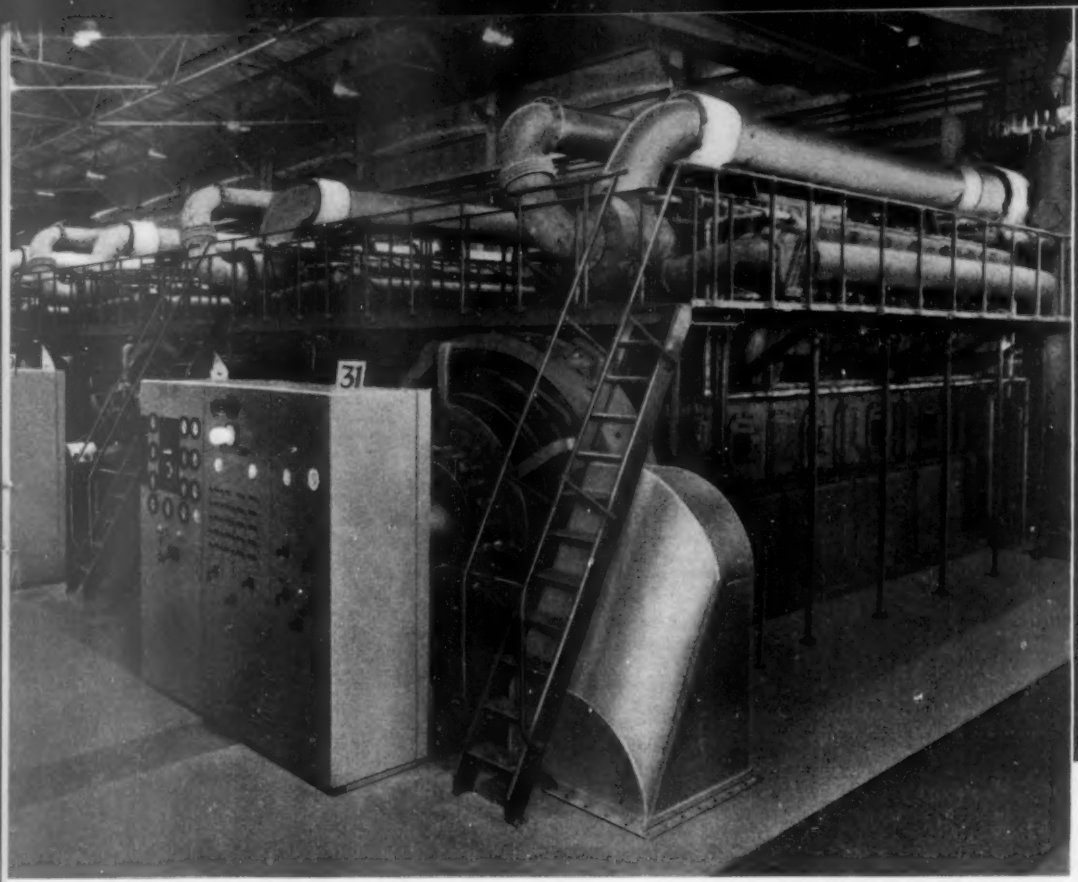


WAREHOUSE BARGE also serves as living and working quarters for several men (Fig. 6).

HOW REYNOLDS METALS LINED UP RECORD-BREAKING SAVINGS

-- with 155,400 Cooper-Bessemer Horsepower





Left, opposite: Craneway view of 6 of the 9 Cooper-Bessemer LSV-16's driving General Electric A.C. generators for over-all plant service. Both these and the O.C. potline units, 42 Cooper-Bessemers in all, are completely protected from any type of operating damage by automatic shutdown devices with suitable anticipatory alarms.

Above: Line-up of 16 of the 33 Cooper-Bessemer LSV-16, 3,700 hp gas engines, driving General Electric O.C. generators, for powering pot line No. 1 in Reynolds' new Corpus Christi aluminum reduction plant.

RECORD-BREAKING is right! There's no other electric generating facility in the United States that can match the low cost power of the Reynolds Metals Company's huge new aluminum reduction plant at San Patricio near Corpus Christi, Texas.

Shown here are some of the 42 big Cooper-Bessemer LSV gas engines that help make this remarkable economy possible. These are 3,700 hp, spark-ignited, 4-cycle, 16 cylinder *supercharged* engines – Cooper-Bessemers with a thermal efficiency that consumes only 10 cubic feet of gas per kilowatt hour. To give you a rough idea, these Cooper-Bessemers at Reynolds Metals *save* enough *daily* to serve a city of 25,000 population.

Add to this efficiency the fact that these Cooper-Bessemers are quiet, smooth-running engines, designed for continuous operation. You'll find that it means, as usual, exceptional economy and satisfaction *plus*.

The
Cooper-Bessemer
Corporation

MOUNT VERNON, OHIO — GROVE CITY, PENNA.

New York Washington, D. C. Bradford, Pa. San Francisco Houston, Dallas, Greggton, Pampa and Odessa, Texas Seattle Tulsa Shreveport St. Louis Los Angeles Chicago Caracas, Venezuela Cooper-Bessemer of Canada, Ltd., Halifax, Nova Scotia Gloucester, Mass. New Orleans, La.

of the barge. The air is then directed into the other two compartments on the opposite end, forcing the water out of these compartments in turn. The barge then begins to float and is towed to its new location.

Sinking operations are just the reverse. The two compartments at one end are flooded by opening valves, permitting water to enter those compartments and sinking that end of the barge. Then, in turn, the other two valves are opened and the remaining compartments filled with water, submerging the lower section. This barge can be operated in very shallow water, as well as in depths up to 12 ft.

In Fig. 3, the barge is seen during the original sinking operation. It seems to be at a very precarious angle; however, it responded just as the model and previous calculations had indicated. The slope here is approximately 13°.

In the actual sinking operation the water could not enter the compartment because the water intake manifold became clogged with mud. The elements forced a quick solution of this problem, however. About the time the photograph was taken a squall was making its entrance into Quarantine Bay. The barge was designed to withstand winds of 125 m.p.h., but not in this position. The question was whether to use the compressed air to raise the barge and get out, or to use the air to try to blow the mud free and to sink the barge. It was decided to use the compressed air to clean the sea chest. This was accomplished and submerging operations were successfully completed.

The maintenance cost is not available at this time because this barge has only been in operation some 8 months; however, the maintenance cost is not expected to exceed that of a piling-type tank battery. The barge, heater-treater platform, house, and walkway are 100 per cent salvable. The landing platform is only partially salvable.

WELL-SERVICE BARGE of very shallow draft is used for production service operations (Fig. 7).

Test barge for undeveloped areas . . . In undeveloped areas where testing facilities are not available, an old fuel barge 92 by 26 by 6 ft., with a 2,500-bbl. capacity, is used for a test barge. A portable separator is mounted on the barge. This test unit is moored by the rig when the well is completed.

After the rig is released, permission is requested from the Coast Guard to produce the well into this test unit temporarily, until such time as more permanent type storage facilities can be installed. This procedure is involved, complicated, and costly.

Compressor barge . . . There are three compressor stations* and dehydrator plants installed in the Gulf bay fields in South Louisiana. One of these is illustrated in Fig. 4. The heaters and tanks are mounted on a platform and are adjacent to the barge. The compressor barges and platforms were installed during October 1951. The compressors on these barges compress casing-head gas from Gulf's three largest bay fields for delivery into a pipe line. The purpose of these barges is one of conservation rather than one of economics.

*For additional details on this subject, see article by Walter Rose, The Oil and Gas Journal, February 25, 1952, page 144 et seq.

THE AUTHOR

H. L. Scott is assistant zone superintendent of production for Gulf Oil Corp. He is a Texas A. & M. graduate, with a B. S. in petroleum engineering. He joined Gulf upon graduation in 1940, but after 2 years went into the Army. Discharged as major in 1946, he rejoined Gulf, and for 5 years was in South Louisiana fields.

Roustabout barge . . . Fig. 5 is a barge constructed to serve the same purpose for water operation, that a lease truck does for land operations. This roustabout barge, measuring 72 by 24 by 4 ft., is used in Quarantine Bay. The work gang consists of a pusher and five men.

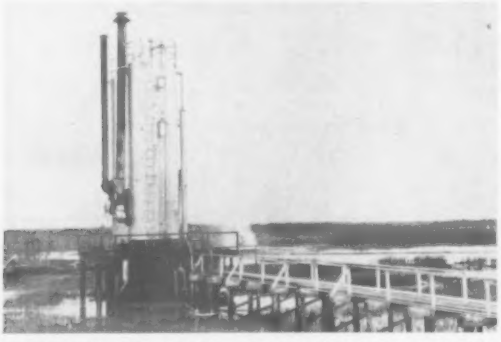
This barge is powered by one 40-hp. Model 04 and one 140-hp. Model 02 Murray & Tregurtha propelling units. It is equipped with a double drum hoist to raise and lower the spuds. In an 8-hour working day, 3,200 ft. of 2½-in. line pipe can be laid from this barge.

Each gang in Gulf's water areas is equipped with a barge of this type. It is a very necessary piece of equipment.

Warehouse barge . . . This barge functions as a warehouse, complete with bath house, ice plant, room for pumpers, kitchen, bedrooms, and office. Fig. 6 is aerial view of warehouse barge anchored at Quarantine Bay.

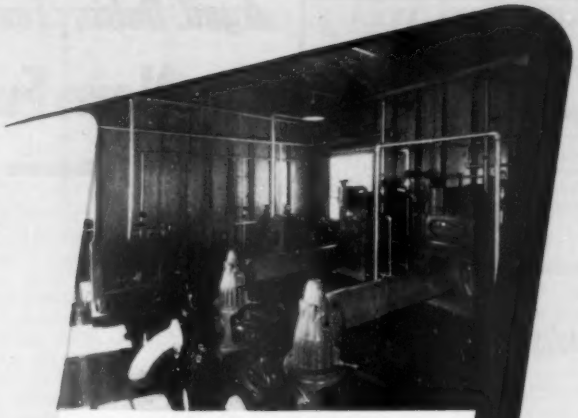
Well-service barge . . . Fig. 7 shows

(Continued on page 364)



HEATER-TREATER installation at Quarantine Bay is constructed on pilings (Fig. 8).

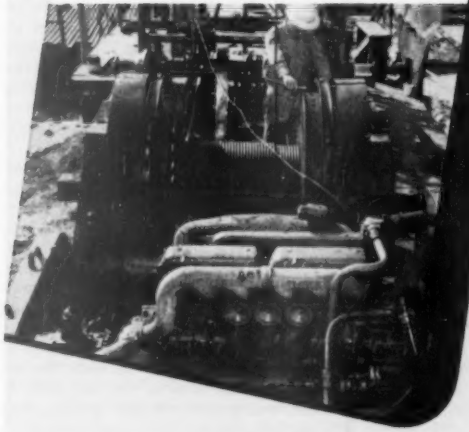
HEATER-TREATER installation at Grand Bay is used in conjunction with submersible tank battery barge (Fig. 9).



Hercules Powered Pumping Units

Hercules Powered Pumping Unit

Hercules Powered Drilling Rig



Engine Specialists Since 1915

Hercules ...all the way!

Yes, all the way from the oil fields to the refined petroleum product you'll find dependable Hercules high-speed, heavy-duty gasoline and diesel engines and power units helping men and machinery produce the many urgently needed petroleum products.

For over 36 years, Hercules Motors Corporation—Engine Specialists—has been producing engines for all types of equipment. Wherever petroleum products are produced, you'll find Hercules powered drilling units . . . pumps . . . generator sets . . . trucks . . . exploration equipment as well as many other types of machinery.

For complete information and specifications on any of the 65 Hercules models—3-500 H. P. gasoline, gas, kerosene, L.P.G. or diesel engines —contact a Hercules oil field branch or distributor or write . . .

HERCULES MOTORS CORPORATION - Canton 2, Ohio, U. S. A.

Agua Dulce, Texas,

New Fuel

by H. L. Ingram

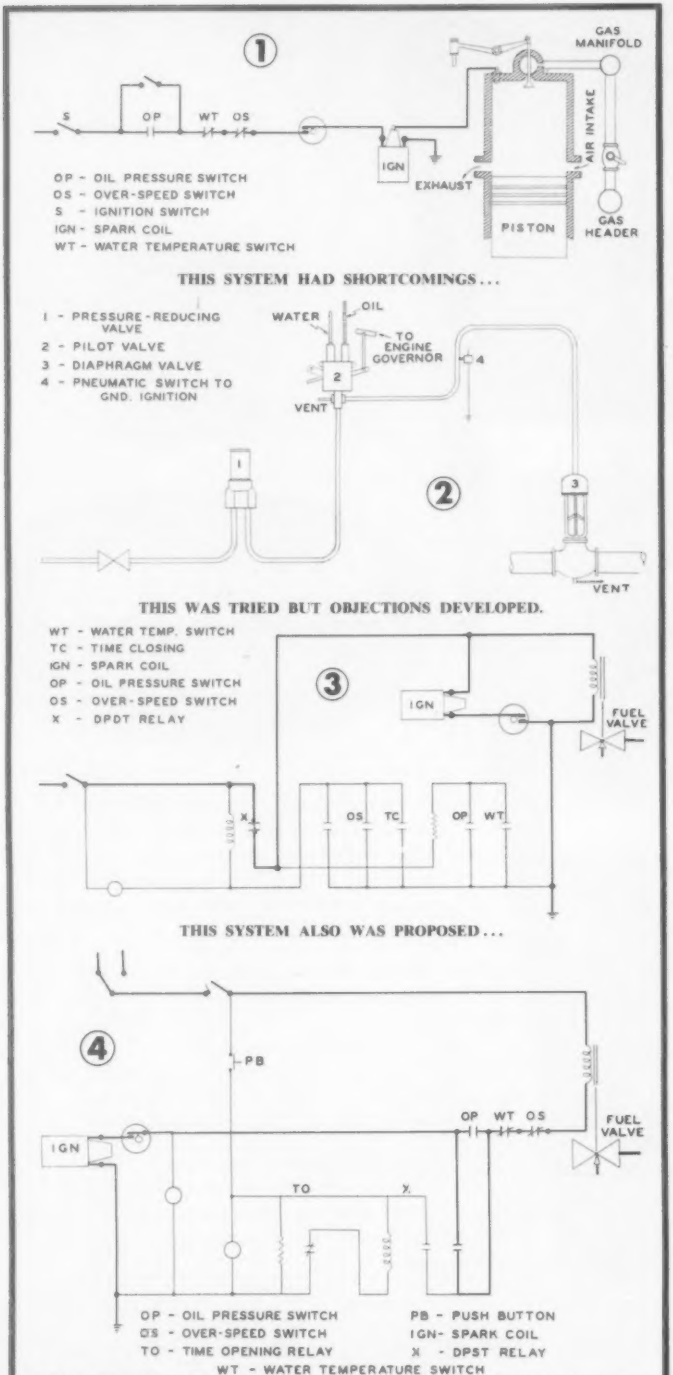
TENNESSEE GAS TRANSMISSION CO. operates a widespread network of gas gathering lines in the Gulf Coast area, feeding its trunk systems moving natural gas to eastern markets. At the company's southernmost compressor station near Agua Dulce, Tex., a new fuel safety system for two-cycle gas engines was worked out and installed on a trial basis, about a year ago. After the new system proved satisfactory at this location over a sufficient period, additional installations were made at other compressor stations on the company system. A large number of compressors are now equipped with this safety device and their performance to date has been very satisfactory.

The development is considered significant in the company's operations, since two-cycle gas engines rated at a total of almost half a million horsepower will be in operation on the Tennessee Gas Transmission system by the end of 1952.

Referring to Fig. 1, it is possible, with gas-inlet valve and piston stopped in certain positions, for fuel gas to leak past the cylinder rings into the crank case or into the air system of the engine. Opening the ignition switch at the moment of proper gas and air mixture may result in an explosion due to the spark. This has happened a few times in the past, damaging equipment and endangering personnel. To eliminate this hazard, several methods have been investigated.

The company employs 12-volt ignition on engine-driven gas compressors. Either of the dual-ignition circuits are available to each engine through a transfer switch. Suitable pilot lights indicate the status of these circuits. The two 12-volt circuits have a common neutral and are supplied through rectifiers which have 120-volt 3-phase primaries. These rectifiers are supplied from separate banks of 480/120-volt transformers located in the 480-volt distribution switchboard serving that particular area.

It was decided that to eliminate the hazards in engine shutdown from any cause, the ignition circuit should be opened, the fuel valve closed, and the engine cylinders vented, automatically. Naturally the simplest way of accomplishing this result was most de-



FINAL WIRING DIAGRAM USED; PROVIDES SATISFACTORY COMPLETE PROTECTION.

Compressor Station Is First Installation of

Safety System for Two-Cycle Gas Engines

sirable and should include the usual safety devices: overspeed, water temperature, and oil-pressure protection.

One method submitted for the above purpose is shown in Fig. 2, in which **1** is a pressure reducing valve for maintaining 15 lb. of air pressure, **2** is a pilot valve operated from oil pressure, water temperature or overspeed, and **3** is a three-way valve, held in the open position by 12 lb. of air pressure. On the surface, this appeared to be a satisfactory arrangement.

But the following objections have been encountered. The attachment of the overspeed device to the governor was not practical on many of the existing engines and the introduction of air as an operating medium would be one more source of trouble. The oil-pressure valve, normally open at standstill, has to be manually closed during the starting period, which introduces the human element with its many implications. Should this valve be left closed until the engine shuts down from any cause, the fuel valve would not close, setting up the possibility of the trouble from which relief was wanted. After consideration, this arrangement was obviously eliminated.

An all-electric system, a wiring diagram of which is shown in Fig. 3, was also proposed. In this arrangement a standard relay with one normally open and one normally closed contact is used in conjunction with a time-closing relay having a normally open contact, to supplement the operation of the usual overspeed, oil-pressure, and water-temperature protection. As proposed, this system operated off the engine ignition, which was desirable since no extra operating medium is required. Here the overspeed device operates instantly, while a time delay of 45 seconds was imposed upon the operation of the oil-pressure and water-temperature switches.

This time delay had the disadvantage of also setting up the possibility of the trouble from which relief was wanted. Elimination of the time-delay feature by wiring the oil-pressure and water-temperature switches like the overspeed switch would be satisfactory except that this scheme depends upon normally open contacts, which might, unnoticed, become inoperative and fail when needed.

After discarding the two methods of fuel safety submitted above, it was decided to develop a system that would eliminate the various unsatisfactory items that had been encountered.

Successful System

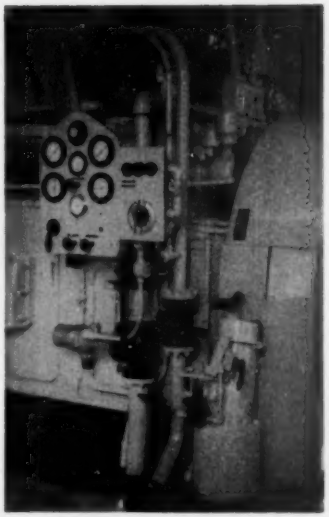
The wiring diagram shown in Fig. 4 was developed after some deliberation. The dual bus bars with selector switch are shown at upper left, with the engine ignition switch appearing next. From here the circuit passes through a series-holding coil on the fuel valve and normally closed overspeed and water-temperature switches. The oil-pressure switch is shunted during the starting process by a relay X which in turn is controlled by a time-opening relay which automatically removes the oil-pressure switch shunt after approximately 1 minute.

With all devices connected in series, the operation or failure of any one will disconnect the ignition and release the fuel valve which is spring-closing and self-venting. A red pilot light indicates that ignition current is available up to the distribution.

The white pilot light indicates that the timing relay is in operation and the oil-pressure switch shunted. When the white light goes out normal operating conditions have been restored. The fuel valve is a normally opened three-way valve, electrically held by a current of ½ amp. or more. As an additional precaution, the switches, pilot lights, relays, etc., have been housed in explosionproof condulets.

At very low speed, on some types of engines, the burning out of the white pilot light has caused a shutdown but this occurs so seldom that no provisions have been made to take care of this situation.

Starting procedure . . . An ignition bus bar is selected; about half of the engines in a compressor building are operated from each of the dual bus bars. The engine is rolled by air until the cylinders are purged and engine has reached starting speed, then the ignition switch is closed and the push button is pressed shunting the oil-pressure switch, starting the timing relay, and lighting the white pilot light. The fuel valve is then opened manually and is held in this position by the ignition current. Gas is then fed to the engine as in a normal start, and the compressor placed in service. After approximately 1 minute, the shunt is removed from the oil-pressure switch by the timing relay and the white pilot light goes out. It has been interesting to note that normal starting time is 12 to 14 seconds.



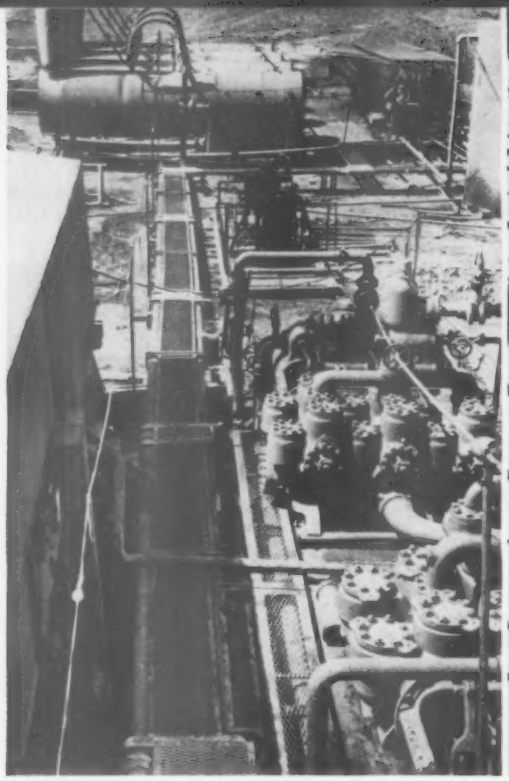
Electrical equipment is mounted to right of engine instrument board; fuel valve just below.

The photograph shows the electrical equipment mounted to the right of the engine instrument board, and the fuel valve just below. It is likely this equipment will eventually be mounted in and become a part of the manufacturer's instrument board.

THE AUTHOR

H. L. (Heinie) Ingram, Tennessee Gas Transmission Co. electrical engineer, who designed most phases of the fuel safety device described here, holds two engineering degrees from Texas A. & M. College, which isn't unusual. What is unusual is the fact that they were bestowed 19 years apart; the first, a B.S., in 1910, a regular degree at graduation time; the second, an E.E., a professional degree given for work, a thesis, an examination, and meritorious work in the field.

He has 42 years' experience in the electrical engineering field, including 2 years with General Electric, 8 with Texas Electric Railway, 20 years with Pure Oil Co. and The Texas Co.; 6 years with Consolidated Steel Co., and 6 years with Tennessee Gas.



UNITIZED PIPE BUNDLES leading from the boilers and water supply to the drilling rig.

ADJUSTABLE STABBING BOARD saves several hours' time during drilling operations.

Drilling Report: Gulf Coast's Gohlke Field

by R. L. Walker*

Something new has been added—a fostered competition between company crews and crews of contract rigs punching hole in the same field. And both parties share in the payoff in this prominent Gulf Coast field.

A FRIENDLY, cooperative, yet competitive, spirit between Shell Oil Co. and contract rigs has paid dividends for both parties in the drilling program in Gohlke field, located approximately 20 miles north of Victoria, Tex.

By free interchange of drilling information, gratifying results have been realized through reduction of drilling time and costs. For the first time in a continuous drilling program, Shell adopted the procedure of having graphical bit records periodically furnished to both company and contract tool pushers as the drilling development progressed. An example of the form in which the bit record was distributed is shown as Fig. 1.

*Houston area drilling engineer, Shell Oil Co.

Drilling time decreased . . . The first five Wilcox completions at Gohlke, shown on the form, were drilled with contract tools and the shortest time from spudding in to completion was 31 days. The first well in the field which was drilled with company tools, the sixth completed, required only 25 days.

Immediately after completion of this well, the procedure of circulating the graphical bit record was adopted, and a new record was issued after the drilling of each three or four wells. The information on the printed form was augmented, of course, by discussions between contract and company personnel.

An examination of the bit record shows how both parties were able to take advantage of the drilling information developed by each. Drilling times for company and contract tools decreased in almost direct proportion to each other.

Bits

Previous experience gained in drilling with jet fishtail bits in Provident City field near Sheridan, Tex., and with jet rock bits in the shallow Big Foot field, Frio County, Texas, was used as a guide in the selection of bits for the first wells drilled by company tools in Gohlke field.

Now that the company rig has drilled 17 wells in this field, we have standardized on a general bit program. The use of two-way jet fishtail bits has resulted in more footage per bit and penetration rates of from 30 to 50 per cent better than jet rock bits through

6 reasons why you should choose

PELTON

long stroke hydraulic pumping jack

a better way to pump an oil well

Over twelve years' experience by major and independent oil producers with hundreds of Pelton Long Stroke Hydraulic Pumping Jacks reveals unprecedented records in oil production and in low cost pumping.

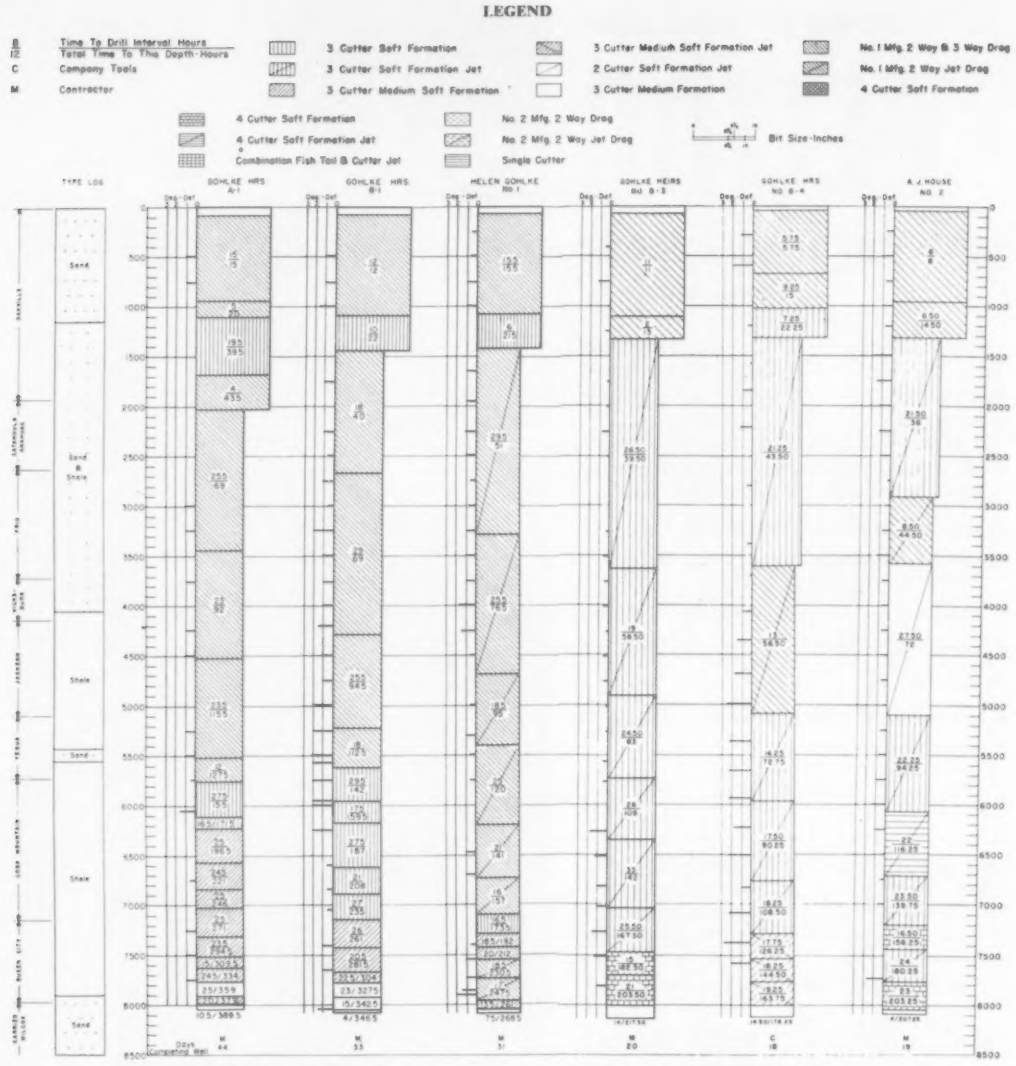
Analyzing results of these Pelton installations which are largely in Texas, Oklahoma and California fields, the following six advantages were gained with stroke lengths from 10 - 30 ft:

1. **SIMPLICITY OF SUCKER ROD PUMPING RETAINED.**
2. **INCREASED OIL PRODUCTION through Pelton Long Stroke.**
   Bottom hole pump efficiency increased.
   Pumps with 4-6 times greater capacity can be used.
   Greater effective stroke. Less stroke loss due to rod stretch.
3. **REDUCED WELL MAINTENANCE through Pelton Long Stroke.**
   Sucker rod failures reduced as much as 95%.
   Bottom hole pump life increased.
4. **REDUCED DOWN TIME through Pelton Long Stroke.**
5. **REDUCED INSTALLATION COST.**
   Low weight—no vibration.
6. **3 - 12 MONTHS PAY OUT.**

PELTON—hydraulic engineers for over 72 years originally pioneered and today lead in the field of Long Stroke hydraulic pumping. Combined with an industry-wide service organization the Pelton Long Stroke Hydraulic Pumping Jack is the accepted method for pumping the deeper wells and the shallower wells with heavy potentials.

Get complete facts from Pelton catalog—yours for the asking.

THE PELTON WATER WHEEL COMPANY
Subsidiary of Baldwin-Lima-Hamilton Corp.
Oil Industry Machinery Division
2447 East 54th Street, Los Angeles 58, California
Los Angeles–San Francisco–Avenal–Dallas–Houston–Odessa–New York City–Philadelphia



BIT RECORDS for the first 3 and the last 3 of 15 wells drilled in Gohlke field (Fig 1).

the Yegua sand (5,500-5,700 ft.) Below 6,000 ft., jet drag bits become rapidly inadequate, and most of the currently available two, three, and four-cutter jet rock bits in soft formation patterns give excellent performance from there to total depth.

The company steam rig being used to drill these wells has a 18 by 8 by 20-in. triplex slush pump. This pump has a rated fluid chamber working pressure of 3,000 psi., and at 50 s.p.m. with 6½-in. liners, has a displacement of 785 g.p.m. These specifications made this pump ideal for use with jet bits. In all instances, the attempt has been made to size nozzles to allow required circulating volumes with the remainder of the hydraulic horsepower being concentrated as nozzle fluid velocity at the bottom of the hole.

With the pumping machine which is available on this rig, we have standardized on two ⅝-in. nozzles or three ½-in. nozzles to total depth of the 8,100-8,300-ft. wells in this field. One-half inch is considered to be the minimum practical size nozzle for drilling here since smaller nozzles tend to wash out and to promote plugging

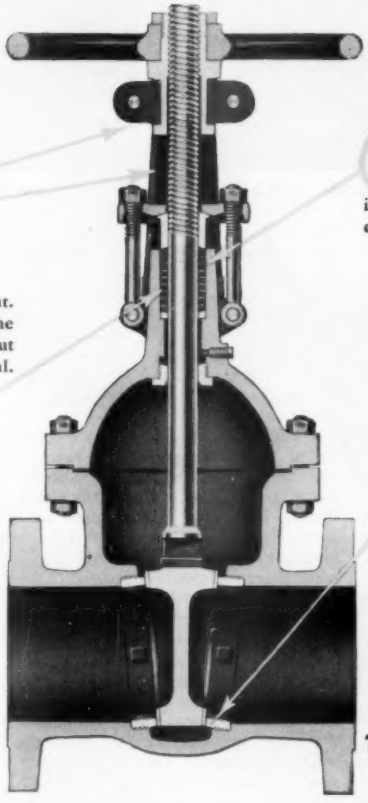
THE AUTHOR

R. L. Walker, Houston area drilling engineer for Shell Oil Co., attended Pratt Institute, Brooklyn, and received a B.E. degree from Georgia Tech. He has been associated with Tennessee Coal, Iron & Railroad Co., Birmingham, and Robert & Co., Atlanta. After 3½ years' service with the U. S. Army in the Panama Canal Zone, Walker joined Shell in January 1948.

"BUILT TO THE SAME SPECIFICATION STANDARDS – I THOUGHT ALL STEEL VALVES WERE ALIKE AS TWO PEAS"

OIC BUILDS FROM THAT POINT UP

LOOK AT THESE FOUR FEATURES:



1 2-PIECE YOLK DESIGN

simplifies replacement of yoke nut. Pressure can be maintained while the OIC Valve is being repacked. Yoke nut is OIC Alloy 40; non-galling material.

2 STUFFING BOXES

have greater depth than is specified, permitting the use of 7 to 9 rings of packing, with wiper rings below.

3 OIC'S SEAL-EVER PACKING

(exclusive with OIC) lasts 10 to 15 times longer than ordinary packing. It stops pitting and corrosion of stems.

4 SEAT RINGS

are end-seated and are subjected only to compression forces when valve is closed; no loosening of seat rings with repeated opening and closing of the valve. No open spaces to cause turbulence, accumulate dirt and hasten corrosion.

THE BEST STEEL VALVE YOU CAN BUY

This combination involving yoke design, stuffing boxes, packing and seat rings is evidence of OIC's desire to build *beyond* minimum specifications.

THE OHIO INJECTOR COMPANY, WADSWORTH, OHIO

OIC
FOUNDED 1883

VALVES

FORGED AND CAST STEEL · IRON · BRONZE

AIR HOIST is used to pull drill pipe into V-door on rig.

TANK-TYPE TRACKS mounted on substructure.

if there is any foreign matter such as sticks or pieces of piston rubber in the circulating fluid.

The use of this nozzle size-pump combination has given, at total depth, a pump speed of 40-42 s.p.m. with a maximum pump pressure of 1,650 psi. using 4½-in. drill pipe. This pump speed with 6½-in. liners gives a minimum circulating volume of approximately 600 g.p.m., and with the drill pipe-hole size combination being used, gives return velocities of 240 ft. per minute and minimum nozzle velocities of around 280 ft. per second. These are considered excellent conditions for jet drilling. Other drilling mechanical variables have been rotary speeds of from 70-110 r.p.m. and bit weights from 4,000 to 30,000 lb.

Although, in a number of instances, using the jet bits, 30-ft. joints have been drilled down in 1 minute or less, the best extended run from the standpoint of both penetration rate and bit footage was obtained with a two-way fishtail bit which drilled from 1,340 to 4,190 ft. in normal drilling operations. No attempt to set a record was made. This 2,850-ft. span was drilled in 20 hours. Drilling records in the field show that depths of 8,000 ft. have been reached in 10 days (including setting surface pipe) and that single zone 8,200-8,300-ft. oil wells from spudding to rig release are now requiring from 15 to 20 days.

Portability Features

Previous to the drilling program at Gohlke, frequent use had been made of the rig-skidding technique utilizing tank-type tracks under the four substructure legs. However, this technique has been used predominantly in the flat country of West Texas. The terrain in Gohlke field is also unusually flat, and there is a minimum of scrub and underbrush; therefore, this manner of moving was used from the beginning on the first field move of the company rig. Four and one-half days were required to rig down, skid, and rig up the steam rig on the next location.

While it was apparent that considerable rig-building time and expense had been eliminated by the derrick-skidding technique, it was obvious that further reductions in this time were necessary. To accomplish this end, company rig No. 12 has now been made more portable and compact. One of the three mud pumps was eliminated, and the remaining two were placed end to end on a single skid and unitized with interconnecting mud and steam lines intact.

The mud house was mounted on two Athey wagons which eliminated the need for emptying and reloading the mud on moves. Further portability was effected by installing removable tank-type tracks on the engine substructure. This allows the engine substructure to be moved with a very minimum of rigging down from one location to another along the lease road.

Further savings in time and costs were effected through construction of a combination lube-oil and small-supplies storage unit, which replaced the fuel rack, drums, and storage house previously used. Features of this unit are four two-drum oil compartments, a 2,000-gal. oil compartment with outlet connections at each end, and four small-supplies-storage compartments which have a combined storage volume of 250 cu. ft. When this unit was constructed, it was estimated that through reduction of rigging up, dismantling, and truck-handling time and elimination of damaged-oil-drum charges, the expenditure for construction of the unit would be paid out in 6 months of drilling.

The steam and water piping for the rig are unitized in bundles covered with expanded-metal walkways. Each pipe end is equipped with a quick union, and each package or bundle has a lifting eye at its center of gravity to facilitate loading. The exhaust-steam line forms one side of the bundle and the live-steam line forms the other side. The blowout preventer and utility water lines are fitted in the space between the two main lines.

A rig move, from release of this heavy steam rig on one location to spudding on the next location, can now be accomplished in 2 days.

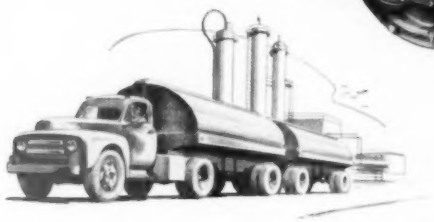
Labor-Saving and Safety Devices

To reduce the time consumed in several oft-performed operations, a number of labor-saving devices have been placed in operation on the company rig. Another primary justification for each of these devices, other than labor saving, was greater safety. A description of three of these devices follows:

1. Adjustable stabbing board . . . With the existing shortage of tubular goods, casing is often available only in mixed ranges. With these varying lengths of casing, it has been necessary to rig up as many as four wooden stabbing boards in the derrick when running casing.

To eliminate the time-consuming operation of rigging up these wooden

Easy shifting helps drivers get the most out of Eaton 2-Speeds

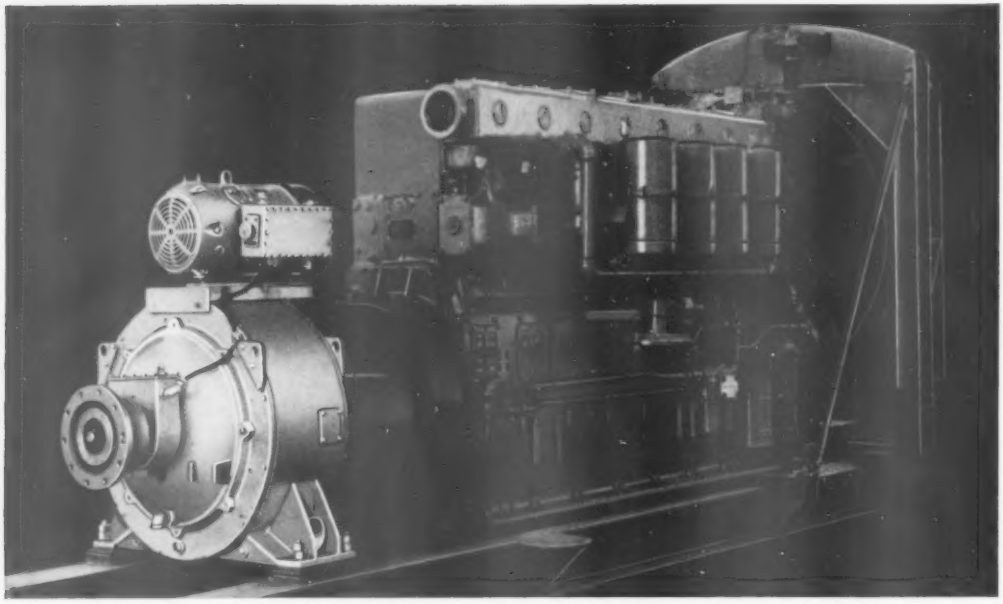


EATON 2-Speeds are easy to shift at any speed—uphill or downhill. Drivers will use all of the gear ratios provided by Eaton 2-Speeds—the right ratio for every road and load condition. Extra maneuverability, coupled with positive control at all times, means less wear and tear—not only on the driver but on the engine, the axle itself, and all power transmitting parts. Appreciable savings are realized in lower operating expense, reduced maintenance cost, and longer truck life. Your truck dealer will be glad to explain Eaton's simplified shifting, and show you how with Eaton 2-Speeds your trucks will haul more, faster, longer, at lower cost.

EATON
2-Speed Truck
AXLES

Axle Division
EATON MANUFACTURING COMPANY
CLEVELAND, OHIO

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers



Dynamatic Water-Cooled Couplings for Rig Drives

Adjustable from 2% to 100% Slip in Continuous Operation

Instantaneous Control • No Friction or Wear

The new Dynamatic electro-magnetic Coupling replaces the friction clutch. Slip is adjustable from 100% to less than 2%. Water cooling permits continuous operation at 100% slip with full torque. Explosion-resistant construction. Available in convenient sizes for oil field engines from 350 to 750 horsepower.

Write for technical literature.

Oil Industry Sales and Service Representatives

GRIBBIN & BAYLOR

2930 Pease Avenue
Houston 3, Texas

529 General Petroleum Building
Los Angeles 17, California

Advantages of Dynamatic Couplings

- Engines are automatically brought to operating speed before load is applied.
- Serves as disconnect clutch.
- Infinitely variable torque and speed to rotary table.
- Pump speed and pressure controllable and pump can be stalled continuously at maximum pressure.
- Permit continual raising and lowering of pipe at full engine speed without use of clutch or brake.
- Engines cannot be stalled or loaded at idling speed.
- Master and individual controls give instantaneous response.
- Absorbs engine vibrations and shocks of suddenly applied loads.
- Uses conventional water system with simple connections.
- Has quick-disconnect electrical connections for easy portability.
- No wearing surfaces except bearings.

DYNAMATIC® **CORPORATION** • KENOSHA WISCONSIN

Subsidiary of **EATON MANUFACTURING COMPANY,** Cleveland, Ohio

Dynamometers • Oil Well Draw-Works Brakes • Adjustable-Speed Couplings • Eddy-Current Brakes
Ajusto-Spedes • Shovel Clutches • Press Drives • Lift Truck Clutches • Electronic Controls

stabbing boards, to more efficiently utilize manpower by requiring only one man in the derrick when running casing, to make the casing running operation safer by removing the hazard of a man working from a narrow unstable wooden stabbing board, and to provide easy access to the traveling block and swivel for greasing and repair operations, an adjustable stabbing board was purchased for the company rig.

The board, which can be powered by either an a.c. or d.c. reversible motor, has a vertical working range of from 18 to 45 ft. and is also adjustable in a horizontal direction. In the running of an 8,000-ft. string of 5½ or 7-in. casing, approximately 3 hours of rig time has been saved. An estimated time saving of an additional 3 hours per well results during the running of surface casing and the various repair and rig-up operations performed from the board.

2. Air hoist . . . A single-drum utility air hoist with a 95-ft. per minute lift, at a rated capacity of 3,500 lb., was also provided for the rig. An air hoist was added to perform the majority of lifting, hoisting, and dragging jobs previously performed with the cathead. As experience has shown the cathead to be one of the most hazardous power machines used on the rig, the use of air hoists has been found to definitely increase over-all rig safety.

3. Air-impact wrench . . . On the company rig, a reversible air-impact wrench which weighs 32 lb. and can be easily handled by one man, is used in making up and breaking out nuts on the pumps and blowout preventers for bolt sizes up to 1¼ in. The time for removing and replacing all valve-pot caps and cylinder heads for an eight-pot mud pump has been reduced by approximately 2 hours.

This does not represent any appreciable saving in rig time since there are two main pumps on the rig, and unless both pumps are out of order, when one is in need of repair, the other can be placed on the line. The principal utility of the air-operated wrench on the rig is in reducing fatigue, freeing manpower for other duties, and in the reduction of personnel injuries.

Wrinkleproof Petroleum?

Petroleum provides the two ingredients of a new synthetic known as Fiber V or terylene. Suits made from Fiber V are substantially wrinkleproof and can be washed without any need for a subsequent repressing.

an ACCO product

HELICOID

The gage that retains its original accuracy longer, lasts longer, costs less per gage, per year

The greatest achievement of the gage makers' craft—pressure gages without gears. The Helicoid movement... tested and proved in years of hard service . . . is a simple cam and roller arrangement that gives long, trouble-free service.

FOUR HELICOID FEATURES

1. Stainless Steel Helicoid Roller (no gear teeth)
2. Stainless steel hair spring
3. Long Life Cam (no gear teeth)
4. Corrosion Resistant link and screws

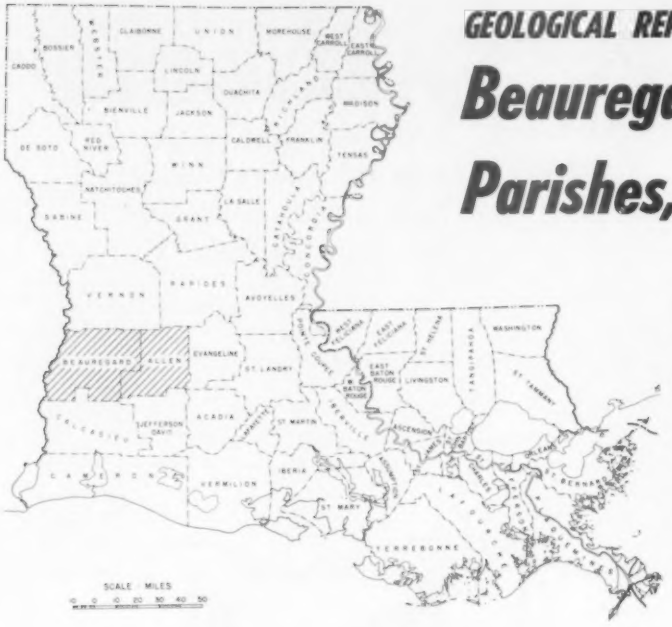
• HELICOID GAGES, which do not have gear teeth to wear out, are made in a full range of pressures...in various sizes and shapes, with black, white and radiant faces. For wall or stem mounting, flush or panel mounting, or flangeless. No finer gages are made. Helicoid Gages cost less in the long run.

Write today for the Helicoid Gage catalog.

ACCO

HELICOID GAGE DIVISION
AMERICAN CHAIN & CABLE
TRADE MARK
977 Connecticut Avenue • Bridgeport 2, Connecticut

HELICOID Pressure • Vacuum GAGES



GEOLOGICAL REPORT:

Beauregard and Allen Parishes, Louisiana

Two regional trends, the Eocene Wilcox and the Eocene Yegua, explain the geological importance of Beauregard and Allen parishes shown in cross-hachured lines on this map of Louisiana. Faulted anticlines and elongate domes are productive of oil and gas. Since 1943, 21 fields have been found in Beauregard Parish and 3 pools in Allen Parish.

by Wilbur C. Holland, Leo W. Hough, and Grover E. Murray

BEAUREGARD and Allen, adjoining parishes, are situated in the long-leaf yellow pine section of the midsouthwestern part of Louisiana.

Beauregard, the larger and westernmost of the two parishes, comprising an area of 1,172 sq. miles, has as its western border the Sabine River, which here separates Louisiana from Texas. Directly to the north of Beauregard Parish lies Vernon Parish, and to the south, Calcasieu Parish. It is bordered on the east mostly by Allen Parish but has, for approximately 1½ miles on the southern end of its eastern boundary, a common boundary with Jefferson Davis Parish.

Allen Parish lies directly east of Beauregard Parish, with its southeastern tip dipping into the great rice-growing section of southern Louisiana. Its southern boundary borders on Jefferson Davis Parish, its eastern boundary on Evangeline Parish, and its northern boundary on Rapides and Vernon parishes. Allen Parish has an area of 663 sq. miles.

Physiography

By Wilbur C. Holland

THE physiography of Beauregard and Allen parishes is controlled entirely by the nature of the Pleistocene sediments; the surface configuration of this area is a reflection of both the mode of accumulation of the terrace deposits and of the subsequent changes that they have undergone. These Pleistocene sediments were laid down as terrace deposits, apparently in response to eustatic changes in sea level during the ice age. Each terrace deposit was laid down as part of a deltaic coastal plain at a time when the sea stood at about its present level. Deposition occurred during interglacial stages of the Pleistocene.

Each interglacial system of deltaic coastal plains extended far coastwise with inland fingers extending up drowned valley and estuaries. Periods of erosion occurred when sea level was lowering during waxing glacial stages. The entrenchment of the old deltaic coastal plains left them as terraces, and continued erosion widened valleys for subsequent alluviation.

Upward movement and tilting of this entire section was going on contemporaneously with the deposition and erosion of Quaternary sediments and is still going on today. This upward movement appears to be an isostatic response to the overloading of the Gulf Coast area in the vicinity of the various Pleistocene deltas. It provided the means whereby each terrace became tilted more steeply toward the gulf than the one next youngest in age.

Topography . . . Elevations in these two parishes range from 210 ft. on the Bentley terrace near De Ridder in the northern part of Beauregard Parish to an elevation of 30 ft. on the Prairie terrace in the southern part of the same parish.

The topography of this area is essentially that of a youthful plain sloping seaward. In Beauregard and Allen parishes there are three distinct steplike levels of this plain, which are called terraces. The coastwise terrace is somewhat lower, flatter, and less dissected than the adjoining inland terrace. The youngest of the three terraces, the Prairie, occupies the most southern position. Next inland is the Montgomery, the farthest inland is the Bentley, which is the oldest of these terraces. These are the coastwise equivalents of the fluviatile terraces that were first named by Fisk* in Grant and LaSalle parishes. Each coastwise terrace has fluviatile extensions up the larger streams and, quite typically, also

*Fisk, H. N., Geology of Grant and LaSalle Parishes, Louisiana Department of Conservation, Geological Bulletin No. 10, pp. 51-63, 1938.

WHICH COSTS MORE PER DAY...

3 DRILLS.....OR 4?

Shot hole drillers now get maximum production at minimum cost per profile using "Blue Demon" Bits . . . because three drills generally do the work that used to require four. That's why oil companies have recognized that Hawthorne Bits are a major factor in maintaining maximum shot hole production at minimum cost . . . by saving up to $2000 per month, or the cost of the extra drill.

Hawthorne Bits get more footage faster every day . . . drilling through hard stringers, interbedded shales and clays . . . saving round trip time usually required for soft to hard formation bit change. "Blue Demons" don't ball up and wall pack like ordinary drag bits in heavy clay . . . don't ball up like roller bits in dense shale . . . assuring faster footage more efficiently per day.

"Blue Demon" drill 90% of medium and hard formations as easily as roller bits costing six times more . . . drill all formations faster than ordinary drag bits, and drill more than five times the footage per bit.

That's why your shot hole crews now get maximum shot hole production at minimum profile cost . . . in the face of rising drilling costs in recent years.

●

This is an example of how Hawthorne "Blue Demon" Rock Cutter Bits reduce bit cost and allow more production with fewer round trips for bit change.

You always get cleaner, straighter holes faster with "Blue Demons".

HAWTHORNE
"BLUE DEMON"
ROCK CUTTER BITS
REPLACEABLE BLADES
1⅞" - 10"

PATENTS PENDING

WRITE FOR ILLUSTRATED CATALOG

HERB J. HAWTHORNE INC.

P. O. BOX 7366, HOUSTON 8, TEXAS

IN THE PROMPT HANDLING OF OIL LOANS

Knowledge Is Power

Oil and gas men invariably want prompt action on loan applications. A mandatory policy in Second National's Oil and Gas Division is to handle each loan in the minimum time consistent with sound banking.

The basic factor in speeding action on loans is the Department's exhaustive knowledge of the Industry. Its executives are graduate geologists and petroleum engineers of wide experience and the Division maintains extensive data files on the Industry—a card index on all well completions, a running record of oil and gas production, and other continuing records needed to keep its information up-to-the-minute. Only comprehensive information can provide the foundation of knowledge on which prompt, sound decisions must be based.

The executives of this Department talk your language and are in position to understand your problems. Their combination of technical know-how and desire to serve has made Second National

The Gulfcoast's Leading Oil Bank

The SECOND NATIONAL BANK OF HOUSTON

MAIN AT RUSK

CAPITAL AND SURPLUS 15 MILLION DOLLARS

Member Federal Deposit Insurance Corporation

up the larger tributary streams. The innermost margin of each coastwise terrace is somewhat crenulated for the reason that there is a slight erosional break between the deposition of one terrace formation and that of the succeeding formation. The valleys cut during these minor erosional intervals were normally drowned by alluviation during the next depositional stages.

Surface Geology

By Wilbur C. Holland

Pleistocene Terrace Formations

FOUR distinct Pleistocene formations outcrop in Louisiana in the form of terraces. The oldest of these, the Williana is not exposed at the surface in Beauregard and Allen parishes. The other three, the Bentley, the Montgomery, and the Prairie, outcrop in both parishes. These formations were deposited in response to eustatic changes in sea level; a formation was deposited during waning glacial stages, and erosion took place during waxing glacial stages. Consequently, they have an unconformable relationship to each other; they are probably also unconformable on the underlying Miocene formations. All of the Quaternary deposits in these two parishes are of river or marsh origin.

There are several difficulties attendant with determining the thickness of any of these formations. Lithologically, they are very similar to the underlying Miocene sands. Even where both are exposed at the surface, as in the parishes to the north, and where the basal gravels are absent, it is very difficult to establish a definite plane of contact between them. Electrical logs usually do not start near enough to the surface to make them usable as a tool in determining the subsurface bases of the separate terrace formations. Drillers' logs have to be relied upon almost exclusively for determining their character and thickness. Although each terrace formation typically has gravel at its base, in many cases they do not. When gravels are not reported, it is impossible to tell from the drillers' logs where one terrace stops and the next terrace or the underlying Fleming starts. An added complication is the fact that gravels are not limited to terrace bases but occur well up into the formation as a result of local conditions. It is, likewise, impossible to determine the thickness of these Pleistocene formations from surface outcrops because of the lack of sufficient relief and the limited amount of erosion that each has undergone.

W. C. HOLLAND LEO W. HOUGH G. E. MURRAY

Wilbur C. Holland was research geologist for the Louisiana Geological Survey from 1941 to 1942, during which time the field work for his part of this paper was done. He received his Ph.D. from Louisiana State University in 1942 and was assistant professor of geology there for 2 years, 1942-44. In June 1944 he joined Carter Oil Co. as a senior geologist. For the past 8 years he has been doing field work for Carter in Wyoming, Idaho, and Utah. Recently he was transferred to that company's southern division and is now stationed at Natchitoches, La.

Leo W. Hough, state geologist for the Louisiana Geological Survey, was appointed to that position in October 1947. He received his B.S. and M.S. degrees in geology from the Louisiana State University. He worked as geologist for the Louisiana Department of Highways for 16 years and the U. S. Soil Conservation Service for 1 year. As state geologist, Hough advises the Louisiana State Mineral Board on geological problems connected with state lands.

Grover E. Murray, professor of geology, was appointed chairman of the department of geology at Louisiana State University in December 1951. He received a B.S. degree in geology at the University of North Carolina and the M.S. and Ph.D. degrees at Louisiana State University. He worked as a geologist for Magnolia Petroleum Co. in Jackson, Miss., for 7 years. He joined the L. S. U. faculty in 1948 and teaches stratigraphy, field geology, and Gulf Coast geology.

Williana formation . . . There is no surface exposure of the Williana formation in either Beauregard Parish or Allen Parish. It outcrops a few miles north of De Ridder in Vernon Parish as isolated cappings on hills. It also extends nearly to the Allen Parish line in Rapides Parish.

This formation is the most graveliferous of the four Pleistocene formations. It consists of relatively coarse sand containing many lenses of gravel, not only at its base but throughout its thickness. It is probable that erosion of the Williana in the parishes to the north supplies most of the gravel found in the younger formations.

The Williana delta was probably located north of Jasper in southeastern Texas. Another main delta of Williana time probably was located near Brookhaven, Miss. It is impossible to determine what the thickness of the Williana formation in Beauregard and Allen parishes may have been with the data now available.

Bentley formation . . . The Bentley formation is exposed at the surface over much of Beauregard Parish and part of Allen Parish. It consists mostly of silts with some clays, sands, and locally some gravel. The prevalence of sands and silts on the surface is probably just the reflection of normal soil-forming processes whereby the clay particles are carried down into the soil or carried away over the surface as a result of the action of rain water. Clay within the formation occurs as lenses; the individual lenses are usually quite small, but the total volume within the formation may be large. Associated with the clay lenses and occurring on the surface as a result of weathering are small ferruginous concretions. Gravel deposits within the Bentley formation are highly localized.

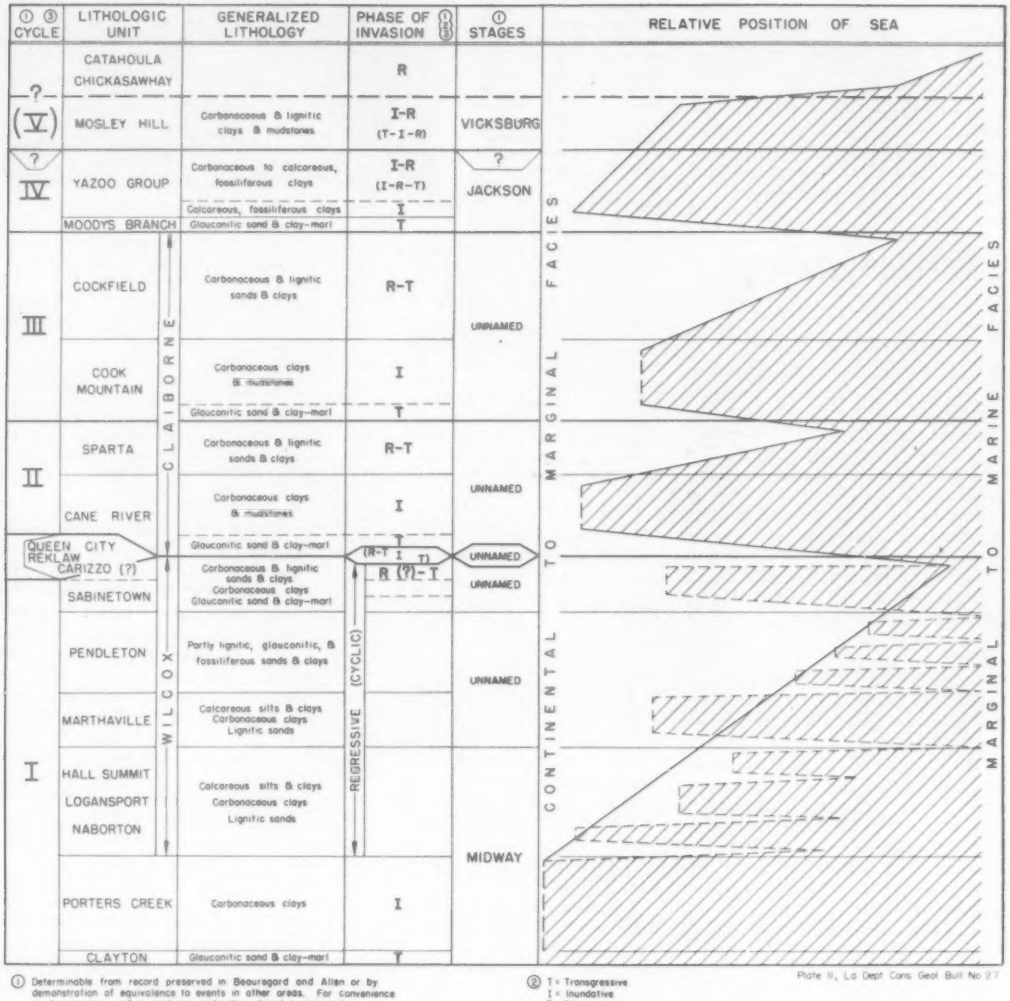
The environmental conditions at the time of formation of the Bentley were that of a deltaic plain. The clays are typical of back-swamp deposition, and the formation of "buckshot" concretions upon the weathering of these clays seems to be diagnostic of this particular type of environment and perhaps may be used as a criterion for this type of deposition. The sands and silts are typically fluviatile deposits. The gravel deposits within the Bentley, particularly those at the base, are thought to be local fan deposits derived largely from the older Williana.

The thickness of the Bentley formation in this area varies from a minimum of a few hundred feet along the northern margin of Beauregard Parish to a maximum of about 1,500 ft. on the western side of this parish.

Because of the extremely variable conditions of deposition, no sequence of deposits can be described as typical, except that, in general, the formation ranges from gravel near its base up through finer and finer material. For this reason no sections are given.

Montgomery formation . . . No major distinction can be made between the lithology of the Bentley and Montgomery formations. Almost the only possible lithologic distinction is that the Bentley contains more gravel than does the Montgomery.

The Montgomery outcrop area in Allen Parish is herein considered to be typically a back-swamp deposit.



① Determinable from record preserved in Beauregard and Allen or by demonstration of equivalence to events in other areas. For convenience in diagramming and in geologic application, basal transgressive concentrates are considered as bases of stages.

② T = Transgressive
I = Inundative
R = Regressive
③ Parentheses indicate phase demonstrable in other [illegible]

Plate II, La. Dept. Cons. Geol. Bull. No. 27

Fig. 1—Columnar chart classification of early and middle Tertiary rocks.

There are no gravel deposits in this area; enough clay is present near the surface to retard subsurface drainage, so that flat areas tend to be swampy.

The outcrop of the Montgomery in southern Beauregard Parish is herein considered as a coastwise terrace. Lithologically, it closely resembles the Bentley formation. It is relatively thin in southern Beauregard Parish because it is very near the northern limit of its coastwise outcrop. In this area the Montgomery probably does not exceed 300 to 400 ft. in thickness. In Allen Parish it is also relatively thin, being the outer edge of an outcrop of fluviatile deposits.

Prairie formation . . . Of the four Pleistocene formations, the Prairie is composed of the finest material. It contains a much higher percentage of clay than any of the other terrace formations. This higher clay content may be demonstrated by the ability of the surface to retain water when flooded for rice crops in eastern Allen Parish. Sand and silt are present in the Prairie, although, here again, the volume may be less than its surface outcrop would seem to indicate. There are no gravel deposits near the surface in the Prairie formation in Allen Parish. However, local gravel deposits occur in the Prairie along the Sabine River in Beauregard Parish probably as local alluvial fans.

The thickness of the Prairie formation cannot be determined exactly with the limited data available, but it probably does not exceed 500 ft. in these parishes.

Recent Alluvium

Recent alluvial deposits occur along most of the major and minor streams in these two parishes. This recent alluvium is all flood-plain deposits. This material consists primarily of fine sand and silts, although locally along some of the large streams, such as the Sabine and the Calcasieu, some clay

EARL L. MANNING *has been a Party Chief with Independent for 9½ years. With the Company for 18 years, he has progressed through virtually every job on a field party, and has a total of 24 years of experience in geophysical work.*

Only Seasoned Men can provide the experienced service you get from Independent

Founded in 1932, Independent Exploration Co. is one of the oldest exploration contractors in the industry operating continuously under the same ownership and management. And Independent ranks high in the individual experience terms of the men who serve you, a factor responsible in a large measure for the success and value of any geophysical survey.

You are invited to avail yourself of Independent's experienced organization whenever we can be of service.

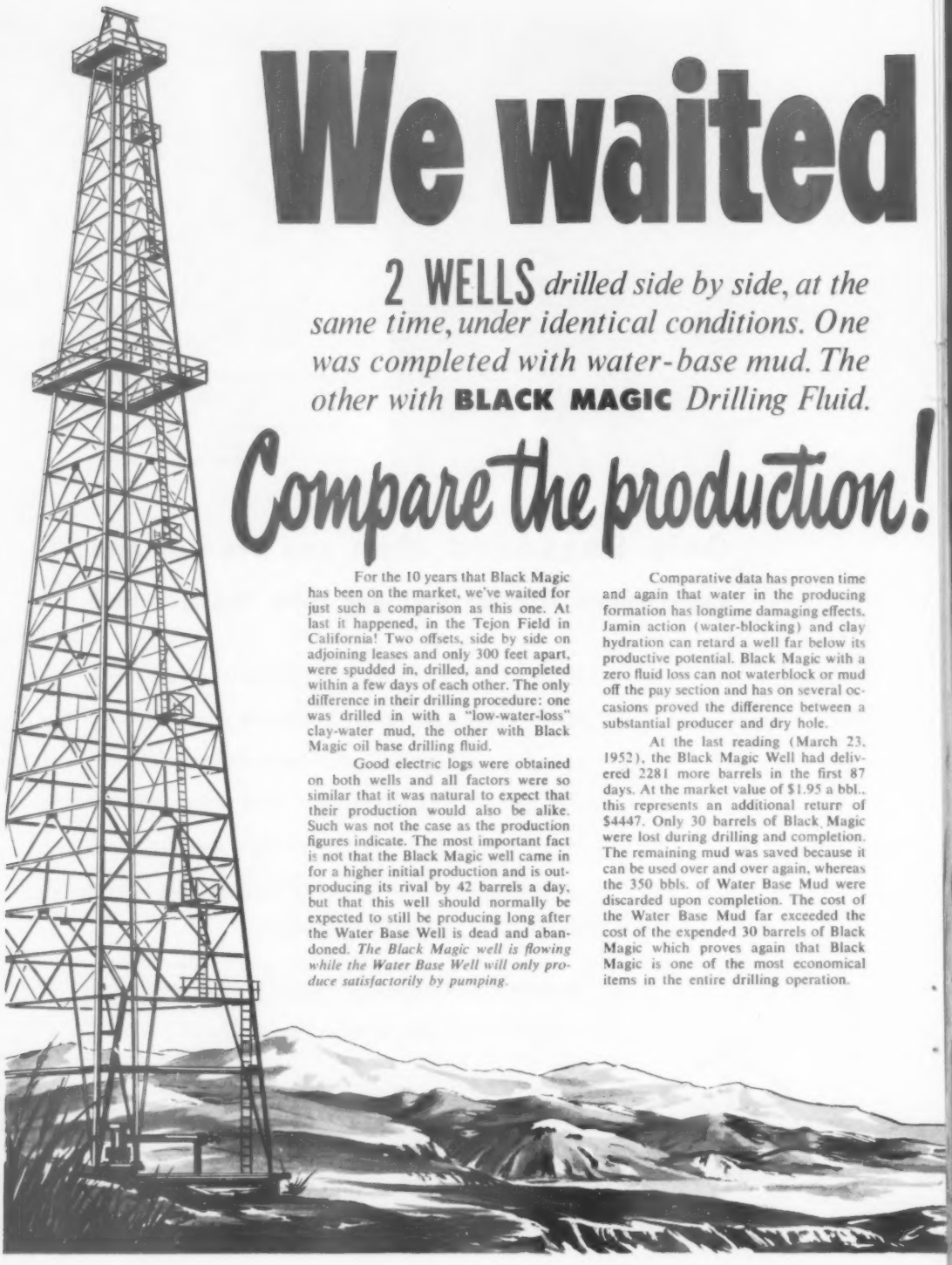
POINTING THE WAY IXC FOR THE DRILL

Independent *Geophysical Surveys*

EXPLORATION COMPANY

1973 WEST GRAY ★ HOUSTON, TEXAS

ESTABLISHED 1932



We waited

2 WELLS *drilled side by side, at the same time, under identical conditions. One was completed with water-base mud. The other with* **BLACK MAGIC** *Drilling Fluid.*

Compare the production!

For the 10 years that Black Magic has been on the market, we've waited for just such a comparison as this one. At last it happened, in the Tejon Field in California! Two offsets, side by side on adjoining leases and only 300 feet apart, were spudded in, drilled, and completed within a few days of each other. The only difference in their drilling procedure: one was drilled in with a "low-water-loss" clay-water mud, the other with Black Magic oil base drilling fluid.

Good electric logs were obtained on both wells and all factors were so similar that it was natural to expect that their production would also be alike. Such was not the case as the production figures indicate. The most important fact is not that the Black Magic well came in for a higher initial production and is outproducing its rival by 42 barrels a day, but that this well should normally be expected to still be producing long after the Water Base Well is dead and abandoned. *The Black Magic well is flowing while the Water Base Well will only produce satisfactorily by pumping.*

Comparative data has proven time and again that water in the producing formation has longtime damaging effects. Jamin action (water-blocking) and clay hydration can retard a well far below its productive potential. Black Magic with a zero fluid loss can not waterblock or mud off the pay section and has on several occasions proved the difference between a substantial producer and dry hole.

At the last reading (March 23, 1952), the Black Magic Well had delivered 2281 more barrels in the first 87 days. At the market value of $1.95 a bbl., this represents an additional return of $4447. Only 30 barrels of Black Magic were lost during drilling and completion. The remaining mud was saved because it can be used over and over again, whereas the 350 bbls. of Water Base Mud were discarded upon completion. The cost of the Water Base Mud far exceeded the cost of the expended 30 barrels of Black Magic which proves again that Black Magic is one of the most economical items in the entire drilling operation.

10 years for this

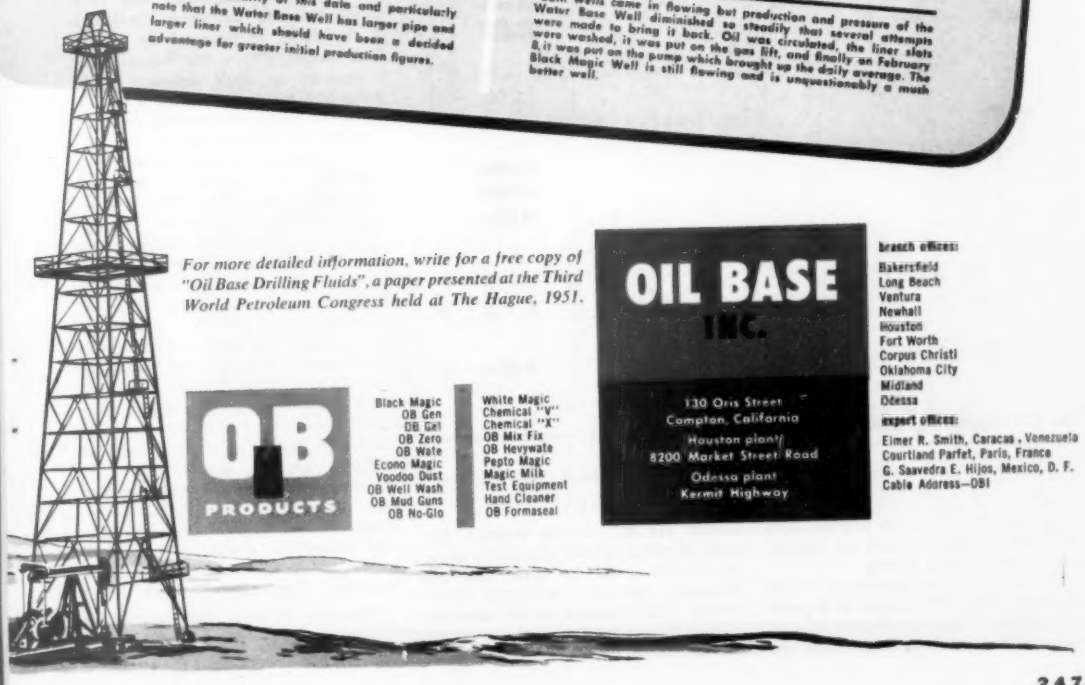
completion data	Water Base Well *	Black Magic Well
Completed	Dec. 22, 1951	Dec. 30, 1951
Total Depth	2936′	2967′
Casing size	8⅝″	7″
Casing set at	2881′	2835′
Liner size	6⅝″	5½″
Liner mesh (slots)	.100	.080
Liner depth	2782′ to 2936′	2813′ to 2967′
Liner length	154′	154′
Productive Interval	89′	90′

*The water base well is 30′ higher structurally.

Note the similarity of this data and particularly note that the Water Base Well has larger pipe and larger liner which should have been a decided advantage for greater initial production figures.

production data	Water Base Well	Black Magic Well
Initial Production	120 B/D*	206 B/D*
Choke size	16/64″	20/64″
Tubing pressure	80 lbs.	90 lbs.
Casing pressure	0 lbs.	10 lbs.
Production (Jan. 7, '52)	75 B/D	128 B/D
Choke size	20/64″	20/64″
Tubing pressure	35 lbs.	90 lbs.
Casing pressure	0 lbs.	160 lbs.
Production (March 23, '52)	99 B/D	141 B/D
Choke size	(pumping)	20/64″
Tubing pressure	20 lbs.	75 lbs.
Casing pressure	600 lbs.	900 lbs.
Total Production (Mar. 23)	7,563 bbls.	9,844 bbls.
Average daily production (from start)	80 B/D	113 B/D

*Both wells came in flowing but production and pressure of the Water Base Well diminished so steadily that several attempts were made to bring it back. Oil was circulated, the liner slots were washed, it was put on the gas lift, and finally on February 8, it was put on the pump which brought up the daily average. The Black Magic Well is still flowing and is unquestionably a much better well.



For more detailed information, write for a free copy of "Oil Base Drilling Fluids", a paper presented at the Third World Petroleum Congress held at The Hague, 1951.

OB PRODUCTS

Black Magic
OB Gen
OB Gel
OB Zero
OB Wate
Econo Magic
Voodoo Dust
OB Well Wash
OB Mud Guns
OB No-Glo

White Magic
Chemical "Y"
Chemical "X"
OB Mix Fix
OB Heavywate
Pepto Magic
Magic Milk
Test Equipment
Hand Cleaner
OB Formaseal

OIL BASE INC.

130 Oris Street
Compton, California
Houston plant
8200 Market Street Road
Odessa plant
Kermit Highway

branch offices:
Bakersfield
Long Beach
Ventura
Newhall
Houston
Fort Worth
Corpus Christi
Oklahoma City
Midland
Odessa

export offices:
Elmer R. Smith, Caracas, Venezuela
Courtland Parfet, Paris, France
G. Saavedra E. Hijos, Mexico, D. F.
Cable Address—OBI

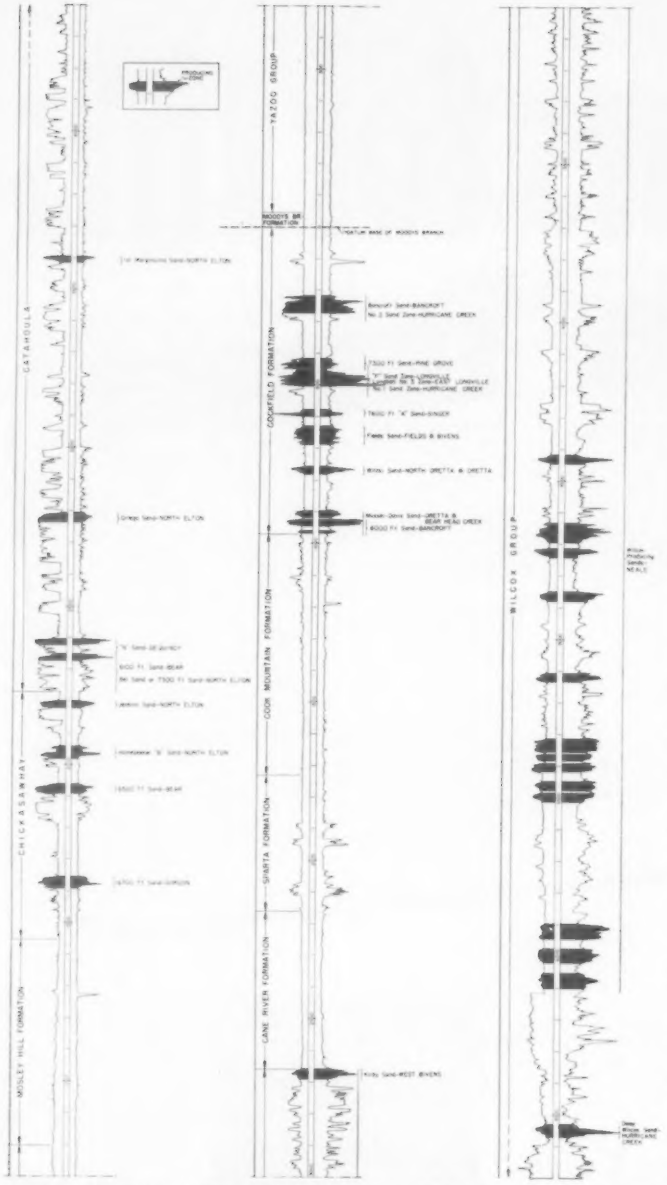


Fig. 2—Composite log, showing stratigraphic sequence and typical development of major producing zones.

is present. None of the streams have sufficient gradient to build up any extensive deposits of gravel.

In this area the thickness of the alluvium along the streams is dependent almost entirely upon the size of the streams; the larger the stream, the thicker are the alluvial deposits. Recent alluvium of the Calcasieu River at Oberlin is 52 ft. thick, and this thickness probably increases down stream. The thickness of the alluvium along the Sabine River should exceed 100 ft.

Surface Stratigraphy

By Grover E. Murray

WELLS drilled for oil and gas in Beauregard and Allen parishes have encountered sediments ranging from Mesozoic to Recent in age. (See Figs. 1 and 2.)

To date all commercial oil and gas production in the parishes has been from the Tertiary sediments. They also offer the best possibilities for future production although Cretaceous sediments are attainable for exploration by 15,000-20,000-ft. wells.

Regional setting . . . These parishes are situated near the early and middle Tertiary (Paleogene*) axis of the gulf geosyncline and on the north (landward) limb of the late Tertiary (Neogene) and Quaternary portion of this feature. Due to downwarping associated with the accumulation of approximately 8,000 ft. of Paleogene deposits, they are south of a monoclinal flexure (Angelina-Caldwell) and north of a similar flexure related to Miocene sedimentary downwarping.

The axes of the north-south trending Northeast Texas syncline (Tyler of East Texas basin or syncline of some) and the Mississippi structural trough are located approximately 100 miles to the west and east, respectively. One of the major upwarps of the Central Gulf Coastal Plain, the Sabine uplift, is situated an equal distance to the north and the LaSalle arch, a smaller northwest-southeast trending upwarp, is about 75 miles northeast.

The general regional structure is homoclinal to the south-southeast with numerous positive and negative warpings, faults, and monoclinal flexings.

From a sedimentary standpoint, the area is near the Paleogene depocenter of the western Central Gulf region. Both Midway-Wilcox and Claiborne depocenters are partially situated in the parishes, and wells drilled to date have logged thicknesses of at least 5,200 and 3,200 ft., respectively. The Jackson-Vicksburg depocenter and all Miocene depocenters are located south of the area. North to south, Claiborne sediments decrease in sand content 30 per cent to almost zero, while the Wilcox sand content similarly varies between 40 and 20 per cent. The Miocene deposits in general vary from 30 to 40 per cent sand, but the lower Miocene (Chickasawhay and lower

*Paleogene is older Cenozoic Tertiary (Paleocene, Eocene, and Oligocene) in contrast to Neogene or younger Cenozoic Tertiary.

EXPLORATION
GEOLOGY
LEASING
DRILLING
PRODUCTION
BANKING

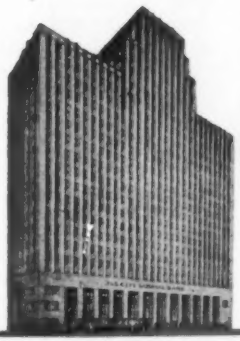
Banking, too

is a vital part of the oil industry

A successful oil operation often depends on the foresight, understanding and assistance of its banking connection.

you are cordially Invited

to consult with our oil department.



THE

CITY NATIONAL

BANK

OF HOUSTON

Member Federal Deposit Insurance Corporation

CAPITAL AND SURPLUS FIFTEEN MILLION DOLLARS

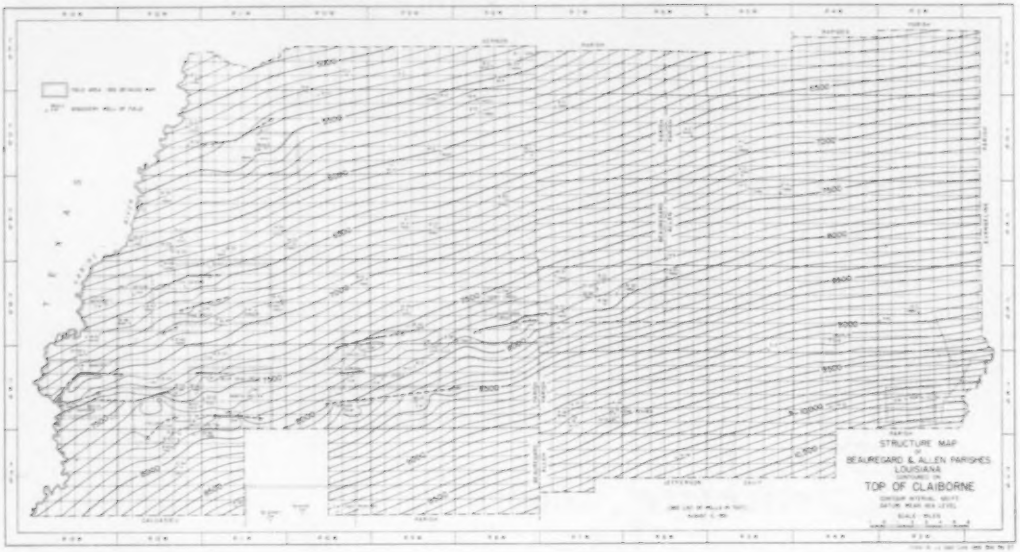


Fig. 3—Structure map of Beauregard and Allen parishes, Louisiana, contoured on top of the Claiborne group; contour interval is 100 ft.

Catahoula) decreases from about 70 per cent to less than 10 per cent sand downdip across the parishes.

The Tertiary deposits are part of a great geosynclinal sedimentary complex of deltaic (fluviatile, marginal, and marine) and marine deposits. The deltaic sediments developed as overlapping, irregularly lenticular sedimentary masses with axes of maximum thickness approximately parallel to the modern shoreline. Marine strata formed around the seaward edges of the individual deltaic masses while marginal and fluviatile sediments accumulated landward from the depocenters.

Kinds of sediments . . . Two major, generalized, lithologic facies, sand and clay-marl, accumulated in the area in the Tertiary. The sand facies, characterized by an excess of sand over clay or shale and marl, contain: (1) blanket sands, typified by great areal extent of individual sands relative to thickness, (2) lenticular sands of varying areal extent, and (3) blanket-sand zones, in which a zone of lenticular sands has great areal extent relative to thickness. The clay-marl facies has an excess of lime and fine clastic sediment over coarse detritus. The marls, which may be arenaceous or argillaceous, are generally extensive but are thinner and less well developed than the clays or shales. Sand facies are predominantly deltaic or marginal-deltaic; clay-marl facies are predominantly marine or marine-deltaic.

Although gulf waters were generally withdrawing during the Tertiary, studies reveal several major fluctuations of the strand during this time. The amount of updip-downdip fluctuations varied along strike. Major invasions extended sufficiently updip to produce alternations of lithologic units which have been the bases for subdividing the column at the outcrop. There, certain lithologic units contain characteristic faunas. Downdip, in the subsurface, some of the fossils transgress extensions of the formational units to which they were restricted at the surface.

Terminology . . . Both lithologic and paleontologic names have been extended downdip into Beauregard and Allen parishes from the outcrop to the north, as well as along strike from areas to the east and west. (See Figs. 1 and 2.) In part, the result is a jumble of stratigraphic names which neither gives a utilitarian concept of extent conditions nor permits a satisfactory working classification. Many of these terms have been modified from their original application and definition to fit the needs of exploration and development.

These Tertiary sediments are parts of large, complex depositional units hundreds of miles across and thousands of feet thick. Unit lithologic treatment of these sequences is virtually impossible even though it is recognized that the most fundamental and concrete of all stratigraphic subdivisions are rock units. In most cases, rock-stratigraphic boundaries are not sufficiently well delineated to permit application in much more than local areas. Variable lithologic and paleontologic facies, depositional environments, and stratigraphic relationships emphasize, on the other hand, the desirability of applying time-stratigraphic terms to these deposits.

Structure

By Leo W. Hough and Grover E. Murray

THE subsurface structure of Beauregard and Allen parishes is shown on the structure map which is contoured on the top of the Claiborne group (Cockfield formation) (See Fig. 3).

The map on the Cockfield shows that the beds strike approximately N. 70° E. in Beauregard Parish on the west and N. 80° to 85° E. in Allen Parish to the east. The beds dip to the southeast, and in western Beauregard the rate of dip is approximately 137 ft. per mile. The dip progressively increases to the east, and in the eastern part of Allen Parish the rate is approximately 162 ft. per mile.

The Wilcox beds strike N. 75° E. in Beauregard Parish, and in Allen Parish to the east they strike N. 85° E. The beds dip to the southeast and south, and in western Beauregard Parish the rate of dip is approximately 147 ft. per mile. The rate of dip increases progressively to the east, and

TEST PUMPING

tells an interesting story

The outstanding features of Layne constructed wells and pumps are pictured and described in a catalog entitled "Layne Well Water Systems." A copy will be sent on request.

"Test Pumping"—is the trial run, shake-down cruise—or field maneuver of every well constructed by Layne. It is these tests that show what skill and experience have accomplished.

But long before the test pumping can be made, Layne has had to do a lot of planning, plotting and figuring out of such things as; kind of sand screen, size of drive shaft, type of bearings, number of pump stages and how much horsepower the motors should have to produce a promised amount of water against a certain pressure.

Once all of the above answers are on paper, they must be transmitted into an underground construction project—a task that requires more than ordinary skill and ability.

But wherever water is needed in quantity and at low cost, you may be sure that units installed by Layne will have unmatched efficiency, operate with utmost smoothness, be ever dependable and capable of lasting many, many years.

For further information on any phase of water development, address

LAYNE & BOWLER, INC.
General Offices, Memphis 8, Tenn.

Layne
WATER WELLS
VERTICAL TURBINE PUMPS
WATER TREATMENT

on the eastern edge of Allen Parish the rate is 175 ft. per mile.

The dip of the top of the Wilcox group in these parishes is approximately 10 ft. per mile greater than that of the top of the Cockfield. This reflects the increased thickness and weight of the Claiborne sediments from north to south in the area. The Claiborne group thickens approximately 250 ft. from north to south in Beauregard and western Allen parishes and approximately 200 ft. from north to south in eastern Allen Parish.

The greatest thickness of Claiborne sediments is in western Beauregard Parish where they measure 3,200 ft. They thin to the east and measure 2,200 ft. in eastern Allen Parish. The steeper dip of the top of the Wilcox in eastern Allen Parish is a reflection of greater downwarping in that area resulting from the increased thickness of Jackson, Vicksburg, Miocene, and Quaternary sediments.

Faulting . . . The most obvious structural features in the area are regional faults with their associated structures in Beauregard Parish. These are generally strike faults with a northeast-southwest trend and are downthrown to the southeast. The associated structures are asymmetrical anticlines and in some instances elongate domes which occur on the downthrown side of the faults. Their axes are usually parallel to the faults, and there is a steepening of dip into the faults.

These structures have provided traps for the accumulation of oil and gas, and numerous producing fields have been discovered on them. It is thought that with increased exploration and drilling that others will be discovered and the trend established in Beauregard Parish will extend eastward into Allen Parish.

These faults are believed to reflect tensional readjustments of the earth's crust resulting from downwarping caused by the great weight and thickness of Miocene and Quaternary sediments to the south.

Petroleum Geology

By Leo W. Hough and Grover E. Murray

THE primary purpose of this section on petroleum geology is to give a history of the oil development in Beauregard and Allen parishes. (See Fig. 4.) The approach has been to study each field and to present data such as the structure, history, producing zones and depths, amount of production, a complete list of wells drilled, and other pertinent information.

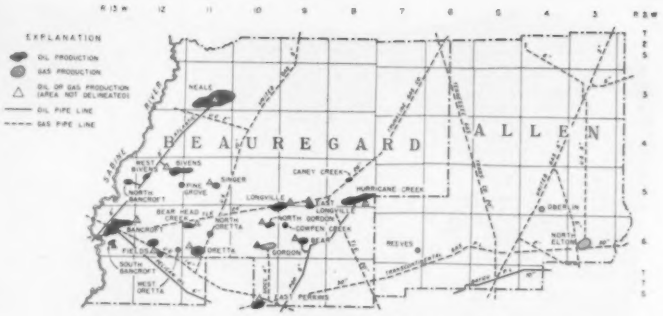


Fig. 4—Oil and gas map of Beauregard and Allen parishes, Louisiana.

The first oil field discovered in Beauregard Parish was Bancroft field which was discovered on April 28, 1938, with the completion of Republic Production Co. 1 Lutcher-Moore Lumber Co., 10-6s-13w, as a gas well. In August 1938, Republic completed 1 Columbia Land & Timber Co. as the first oil well in the field and in the parish. Since that time production has been obtained from 21 fields in the parish. The fields with various statistics are listed in Table 1.

North Elton field was the discovery field for Allen Parish. It was opened with completion of Bel Oil Corp. 1 Bel Estate, 22-6s-3w, as a gas well on June 12, 1939. Since that time porduction has been obtained in three fields in the parish. The fields with various statistics are shown in Table 2.

Neale Field

The major portion of Neale oil and gas field is located in the southern part of Township 3s-11w, in the northwestern part of Beauregard Parish. A small portion of the eastern part of the producing area extends into the western part of Township 3s-10w. It is located approximately 5 miles northeast of the town of Merryville.

Structure . . . The Neale structure is

TABLE 1—BEAUREGARD PARISH FIELDS AND STATISTICS

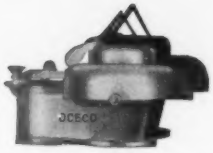
Field name and discovery date—	Total cumulative production*— Oil (bbl.)	Gas (M.M.c.f.)	Condensate (bbl.)
Bancroft—April 28, 1938	5,068,610	25,282	14,608
Bear—April 9, 1943	1,497,832	1,516	.....
Bear Head Creek—June 21, 1946	126,431	920	.....
Bivens—May 16, 1947	654,440	324	.....
Caney Creek—September 24, 1948	101,594	52	.....
Cowpen Creek—February 5, 1951	(†)	(†)	(†)
East Longville—May 17, 1949	299,449	432	.....
East Perkins (Beauregard and Calcasieu)—July 30, 1947	328,128	1,586	1,196
Fields—August 6, 1943	714,329	3,857	48,842
Gordon—March 10, 1944	1,818	5,662	219,755
Hurricane Creek—January 27, 1949	1,438,486	1,123	.....
Longville—December 11, 1946	2,315,819	4,092	.....
Neale—March 14, 1940	12,987,454	31,900	.....
North Bancroft—September 2, 1949	317,470	126	.....
North Gordon—June 13, 1948	34,743	180	.....
North Oretta—January 24, 1946	11,925	32	.....
Oretta—March 8, 1945	437,592	3,148	.....
Pine Grove—February 1, 1945	2,050	4	.....
Singer—February 5, 1947	457,772	398	.....
South Bancroft—November 5, 1948	275,938	556	.....
West Bivens—November 20, 1948	214,270	71	.....
Total	27,196,150	81,261	294,401

*Production through 1950. †No production figures available.

TABLE 2—ALLEN PARISH FIELDS AND STATISTICS

Field name and discovery date—	Total cumulative production*— Oil (bbl.)	Gas (M.M.c.f.)	Condensate (bbl.)
North Elton—June 12, 1939	.....	18,544	307,341
Oberlin—February 9, 1946	18,929	.....	86
Reeves—April 24, 1951	(†)	(†)	(†)
Total	18,929	18,544	307,427

*Production through 1950. †No production figures available.



V-113 VENT VALVES control tank breathing, minimizing vapor losses and deterioration of product. High flow capacity. 2" to 12" sizes. ½ oz. to 8 oz. pressure or vacuum settings.

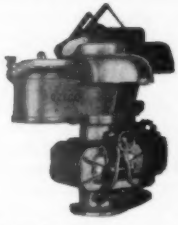
GAUGE HATCHES provide a gas tight closure for gauging, sampling and taking temperature readings. Pedal type hatch opens with a natural straight downward foot movement. Flanged or screw mounting. Also clamping cover type for pressures from 2 oz. to 15 lbs.

V-114 INTERNAL TANK VALVES are provided with a fusible link that melts when subjected to fire, closing the valve instantly, and cutting off the flow from the tank. 3", 4", 6", 8" and 10" sizes.

OCECO FITTINGS

Prevent VAPOR AND FIRE *Losses*

TYPE "E" FLAME ARRESTORS can withstand long exposure to fire. The "banks" have vertical straight through passages—minimizing entrainment and pressure drop, and are "extensible" for easy cleaning. 2" to 10" sizes.



TYPE "BE" VENT UNITS consist of a V-113 Vent Valve with snuffer, mounted on a Type "E" "Extensible" Bank Flame Arrestor. 2" to 10" sizes. Unsurpassed for efficiency and reliability.

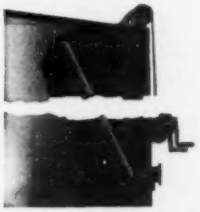
WATER DRAW-OFF VALVES for drawing water from the bottom of storage tanks. Unique double valve construction permits the valve chamber to be drained to prevent freezing, and the working valve serviced without emptying tank. 2" x 1½"; 3" x 2" and 4" x 3" sizes.

● Oceco Vents eliminate the free discharge of vaporized liquids. They control tank breathing resulting from temperature changes and pumping – protect the quality of the stored product – and prevent "blow-outs" and "cave-ins". Oceco Flame Arrestors are a positive flame stop – they prevent explosions and fires.

Specify Oceco Fittings *throughout* for *all* your tanks – and get proven, dependable, trouble-free protection for only a fraction of one per-cent of the value of the tank and its contents.

A few of the most popular Oceco fittings are illustrated and described briefly herewith. But send for the Oceco Data Sheets. They give full details and specifications, and complete listings of sizes, weights, dimensions, etc. Let the Oceco Engineers – pioneers in this work – help you equip your tanks for utmost safety and economy.

V-108 EMERGENCY PRESSURE RELIEF VENTS provide instant relief for excessive internal pressures, resulting from exposure fires, etc. Furnished in 6", 8", 10", 15¼" and 20½" sizes.



SWING LINE EQUIPMENT – complete facilities including heavy duty tank nozzle; efficient double elbow swing joint; swing pipe; cable clamp; cable; sheave bracket and internal or external winch.

SEND FOR THE OCECO DATA SHEETS. Ask for sheets on the individual fittings in which you are most interested, or send for the complete set. WRITE TODAY.

---OCECO---

Engineering and Sales Representatives in the Principal Cities

THE JOHNSTON & JENNINGS COMPANY

4700 West Division Street • Chicago 51, Illinois

★ *division of* **PETTIBONE MULLIKEN CORPORATION** ★

BUZZINI DRILLING COMPANY

Teams Up With

WILSON MANUFACTURING CO. *For the...*

ULTRA-MODERN REMOTE

Although representing a radical departure from design standards, the Ultra-modern Wilson Remote Control Drilling Rig has proved itself *with over three years of field experience*. The Buzzini Brothers, desiring a rig capable of swifter and more economical drilling operations, and one that afforded greater comforts, easier operation, and safer working conditions for the crew, went to Wilson for their needs. Wilson designed and custom built the Remote Controlled Drilling Rig for the Buzzinis *incorporating all famous features exclusive to Wilson Rigs plus many outstanding new features*.

One of the more important features of this amazing rig is the completely Air Operated Remote Control Panel. This ingenious control system gives the driller complete fingertip control of the drawworks, brake, core reel, rotary table, catheads and the mud pump powered off the compound. The air control system used in the console unit has been thoroughly field proved both in the oil fields and in the other industrial uses.

A warning system is also located on this panel to indicate lubricating oil pressures, temperature and electrical supply to the drawworks brake, torque converters, engine crankcase, compound, rotary and transmission. The movability of the unit to any desired position on the derrick floor allows driller the most advantageous view of all drilling operations.

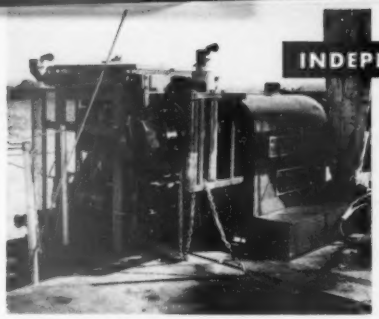
The remote control brake on this rig is of the spring engaged, air disengaged type, using two large air cylinders each with heavy coil spring in the cylinder and one cylinder on each brake ring. Should the air supply fail or an air line be broken, the spring will engage the brake and either spring will have capacity to hold the heaviest load normally encountered.

The brake is operated by a hand brake lever on the driller's right side, and with this lever he can set the brake to "feed off" exactly as he desires and maintain this feed rate for long periods. The brake actually has "feel" in that the driller can feel the exact point where the brake band engages the brake ring, and the harder he pushes on the brake lever the more the brake holds. A final safety valve is also

AIR-TUBE CLUTCHES—*THE WORLD'S BEST*—ON ALL DRIVES

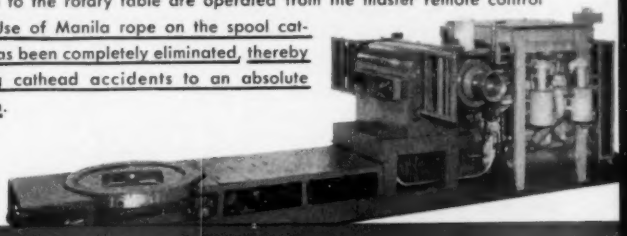
MANUFACTURING CO., Inc.

WICHITA FALLS, TEXAS



INDEPENDENT ROTARY AND CATHEAD DRIVE

Mounted at derrick floor level and powered independently of drawworks, this unit supplies shaft driven power to the flush mounted rotary table. The air-operated catheads are attached to each side of this rotary unit and in addition to the rotary table are operated from the master remote control panel. Use of Manila rope on the spool catheads has been completely eliminated, thereby reducing cathead accidents to an absolute minimum.



Independent Rotary and Cathead Drive, showing part of derrick floor. Spinning Cathead is visible, but Breakout Cathead is hidden behind the derrick leg.

CONTROL DRILLING RIG!

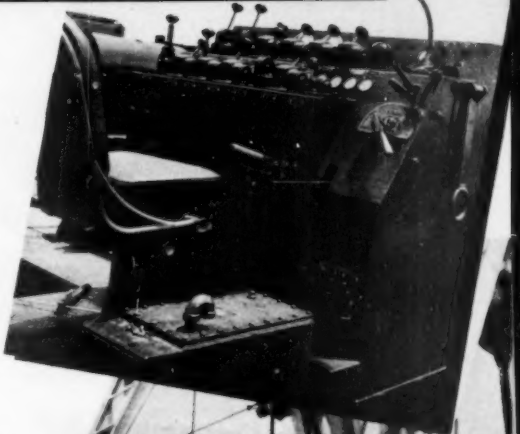
a feature. Should the regular control system fail, when the driller presses down on the brake lever, the last half inch of travel operates a separate valve and dumps all air in the cylinder, and the heavy spring engages the brake without fail.

A dynamatic auxiliary brake is also used and controlled by a foot pedal. Here a special control system assures that the coil in this brake is energized before the load starts to drop and prevents any free fall. This rig was originally equipped with a hand-operated brake carried to the operator's position by rods, but this brake lever is now carried in the tool house for emergency use only and has never been used.

The safety type remote controlled air brake has proved entirely satisfactory and has "Feed," "Feel" and Safety.

More than three years of use have thoroughly convinced the Buzzini Drilling Company of the safety and dependability of the remote control brake plus the convenience of the Wilson Remote Control Rigs, in general. They have purchased a second rig of the same kind, placed an order for a third and state that "all future rig purchases will be Wilson Remote Control Rigs".

MASTER REMOTE CONTROL PANEL



A further step from the conventional was the changing of the engine radiators from a vertical position to a horizontal position above the engine. *This reduces engine temperature by more than 20 degrees, offers easier access to engines by mechanic, reduces rig width to twelve feet, and the radiators need not be faced into prevailing winds during hot weather.*

INVESTIGATE these NEW WILSON RIGS BEFORE YOU BUY!

an anticline on the downthrown side of a major fault which has a northeast-southwest trend. The fault has a throw of approximately 220 ft. at the top of the Wilcox group in the Atlantic Refining Co. 1-A Rice Land & Lumber Co., 22-3s-11w. The long axis of the structure is parallel to the fault. The southeastern portion of the field is cut by a minor fault with a maximum throw of approximately 40 ft. on top of the Wilcox group.

History . . . National Exploration Co. discovered the Neale structure by reflection seismograph for Atlantic Refining Co. in 1938. The discovery well was the Atlantic Refining Co. 1-B D. A. Whitmer, 26-3s-11w, which was completed March 14, 1940, with an initial production of 420 bbl. per day from perforations at 8,350-70 ft. in a sand in the top of the Wilcox group.

Additional drilling and development of the field brought about completions in various other Wilcox sands, ranging from top to bottom of the formation. Some of these sands are: Campbell pay, 11,250 ft.; Rice B-3 sand, 11,000 ft.; Musser-Davis pay, 10,900 ft.; Central Coal & Coke sand, 10,800 ft.; lower Spiers sand, 10,600 ft.; upper Spiers sand, 10,400 ft.; Lilliedoll sand, 10,150 ft.; and the 10,000-ft. pay.

The field was systematically developed in the early 1940's, and a total of 62 wells have been drilled in the area.

In 1943, the Department of Conservation issued orders permitting dual completion of wells in sands in the Wilcox formation. There are several wells that are dually completed at the present time.

Discovery well . . . Atlantic Refining Co. 1-B D. A. Whitmer, located in C NW NE 26-3s-11w; completed March 14, 1940.

Initial production: 420 bbl. per day on 12/64-in. choke.

Gravity: 36.6° A.P.I. at 60° F.
Gas-oil ratio: 300/1.
Tubing pressure: 900 psig.
Perforations: 8,356 to 8,370 ft.
Formation: Wilcox group.
Total depth: 8,616 ft.

Deepest well . . . Atlantic Refining Co. 1 Hawkins unit, 27-3s-11w, drilled to a total depth of 12,584 ft.; entered Porters Creek formation (Paleocene-Midway) at 12,000 ft. and was still in the Porters Creek formation at the total depth.

Producing zones and depths . . . Production is from a group of sands (23) in the Wilcox group which are found at various intervals between 8,300 and 11,618 ft. Many of these sands are thin and are of a very lenticular nature. The average net thickness of oil sand is approximately 370 ft.

Well spacing . . . One well to 40 acres.

Proven area . . . Oil: 3,890 acres.

Louisiana State Department of Conservation orders . . . Orders Nos. 67, 67-A-1, 67-A-2, 67-A-3, 67-A-4.

TABLE 3—GENERAL PRODUCTION FIGURES FOR NEALE FIELD

Year	Oil (thou. of bbl.)	Gas (M.M.c.f.)
1940	329,067	83
1941	840,463	324
1942	890,980	1,021
1943	1,343,620	1,906
1944	2,340,504	4,331
1945	2,296,365	6,839
1946	1,502,043	5,012
1947	1,182,510	4,385
1948	961,688	3,408
1949	717,333	2,390
1950	582,901	2,201
Total	12,987,454	31,900

Additional data on this subject may be found in Geological Bulletin No. 27, Geology of Beauregard and Allen Parishes, Louisiana, published by the Louisiana Department of Conservation, Louisiana Geological Survey, May 1952.

Need EXTRA Protection?

PRS THICK FILM MASTICS

GET THE JOB DONE!

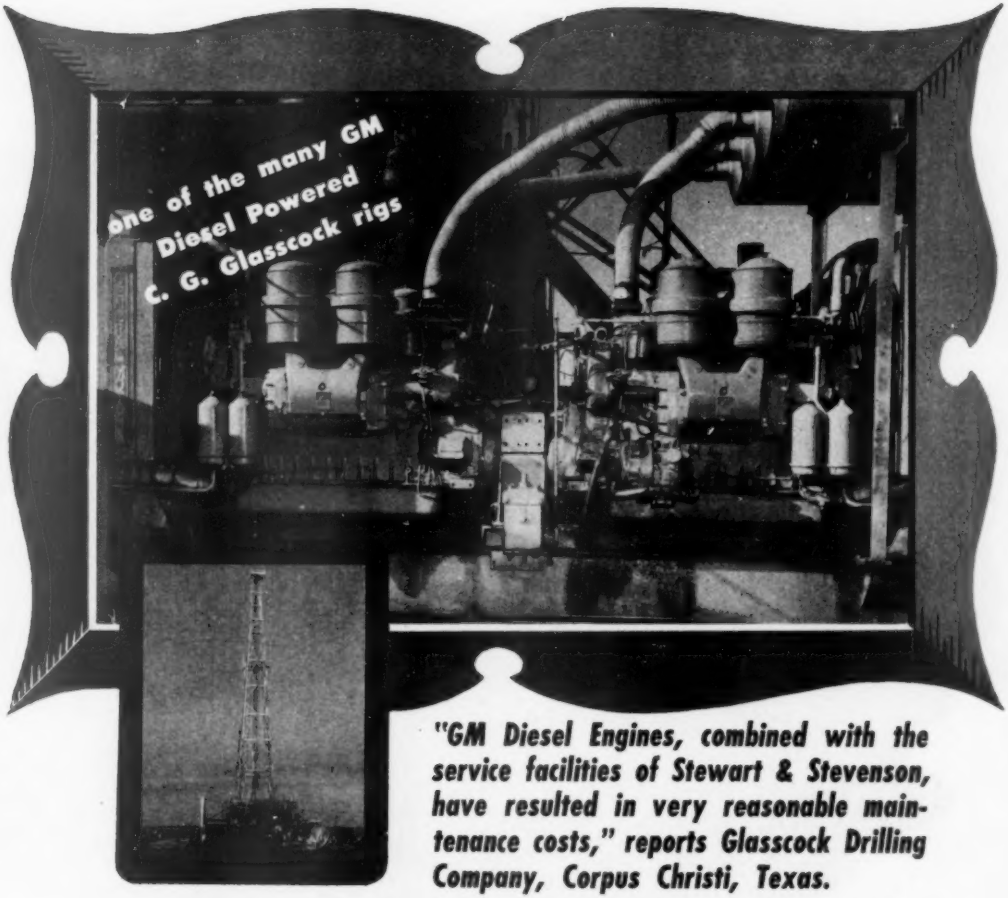
PRS Engineered COATINGS

Formulations of Vinyls, Chlorinated Rubber, Acrylics, and Epon.

Wherever the extra protection of *thick* coatings is needed to meet attack of corrosive agents, PRS especially designed resinous *mastics* have led the way. Why not apply this experience, already field-proven, to your problem?

Write, wire or call us for consultation on your particular corrosion problem!

PRODUCTS RESEARCH SERVICE, INC.
WESTWEGO, LOUISIANA



"GM Diesel Engines, combined with the service facilities of Stewart & Stevenson, have resulted in very reasonable maintenance costs," reports Glasscock Drilling Company, Corpus Christi, Texas.

"We are using GM Diesel Power on a majority of our rigs and in off-shore crew boats," continues the statement from Glasscock Drilling Company, one of Texas' most progressive drilling contractors. "Over four years of continuous drilling service with our GM Diesel Engines operating side by side with other makes of power has developed conclusive proof of the dependability and economy of the GM Diesel Engines. Low cost replacement parts combined with the service facilities of Stewart & Stevenson have resulted in very reasonable maintenance cost."

Dependability and economy are two mighty good reasons why drilling contractors throughout Texas like GM Diesel Engines. Here's why users like to deal with Stewart & Stevenson Services: There's an axiom about engines, proved in thousands of installations: "ENGINES ARE NO BETTER THAN THE PARTS AND SERVICE ORGANIZATION BEHIND THEM." Twenty-four hours a day, seven days a week, there is a Stewart & Stevenson repair man only two hours from your rig. These factory-trained service men arrive at your rig ready to go to work, ready to put you back in business. That's one of the reasons why Stewart & Stevenson is the nation's largest distributor of GM Diesel Engines. In addition, Stewart & Stevenson maintains the largest distributor stock of Diesel power unit parts anywhere — and has the greatest backlog of experience on more different types of diesel and gas engine applications than any other engine distributor. This experience and "know how" is your assurance of a proper engine application which is of utmost importance for successful operation. Contact the Stewart & Stevenson representative today for an analysis of your power requirements.

C. JIM STEWART & STEVENSON 50 1902 1952 HALF CENTURY OF SERVICE TRANSPORTATION AND POWER

3048

STEWART & STEVENSON SERVICES, Inc.

Main Office and Plant: 4516 Harrisburg Blvd., Houston 11, Texas. Phone WOodcrest 9691

Branches: Corpus Christi, Dallas, Lubbock, Wichita Falls, McAllen (San Juan), Odessa.

Representatives: San Antonio, Longview, Brownsville, Beaumont, Laredo, Port Arthur

Distributors of: General Motors Diesel Engines, Continental Red Seal Engines, Chrysler Industrial and Marine Engines, Chicago Pneumatic Engines, Petter Diesel Engines, Gardner-Denver Pumps.

Fabricators of: Engine Driven Electric Generator Sets, Portable Pumping Units, Truck Bodies, Oil Field Equipment.

CHRYSLER

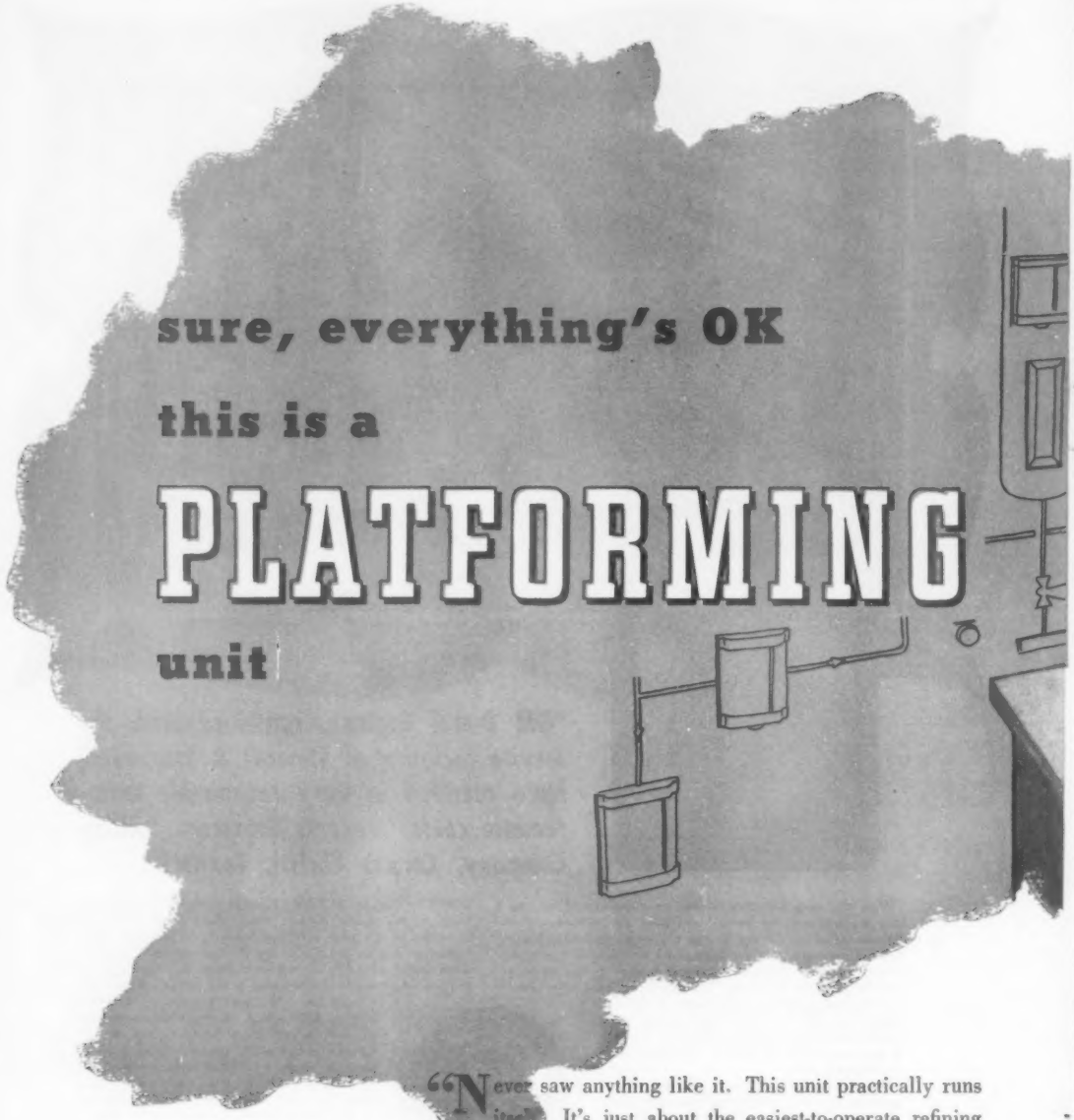
GM DIESEL POWER

PARTS... SERVICE

STEWART & STEVENSON SERVICES, INC.

Anytime Anywhere

THE NATION'S LARGEST DISTRIBUTORS OF GM DIESEL ENGINES



"Never saw anything like it. This unit practically runs itself. It's just about the easiest-to-operate refining process I've ever handled. Any operator would like to handle a unit like this one."

That's right. Platforming *is* a dependable process. It's designed for a consistent high quantity, high quality yield—with a minimum of operator control. *It's a matter of record.* Platforming has stamina too. Witness its record of long catalyst life . . . its rugged versatility in day to day operation . . . its ability to successfully meet the challenges of a wide variety of charge stocks . . . its performance under

the most severe field conditions. *It's a matter of record.*

These are just some of the important reasons why you should select Platforming to solve your reforming problems and to improve your position in meeting the demands of today's competitive markets. Other refiners have done it. *It's a matter of record.*

UNIVERSAL OIL PRODUCTS COMPANY

General Offices: 310 S. MICHIGAN AVE., CHICAGO 4, ILL., U.S.A.
LABORATORIES: RIVERSIDE, ILLINOIS

Universal Service Protects Your Refinery

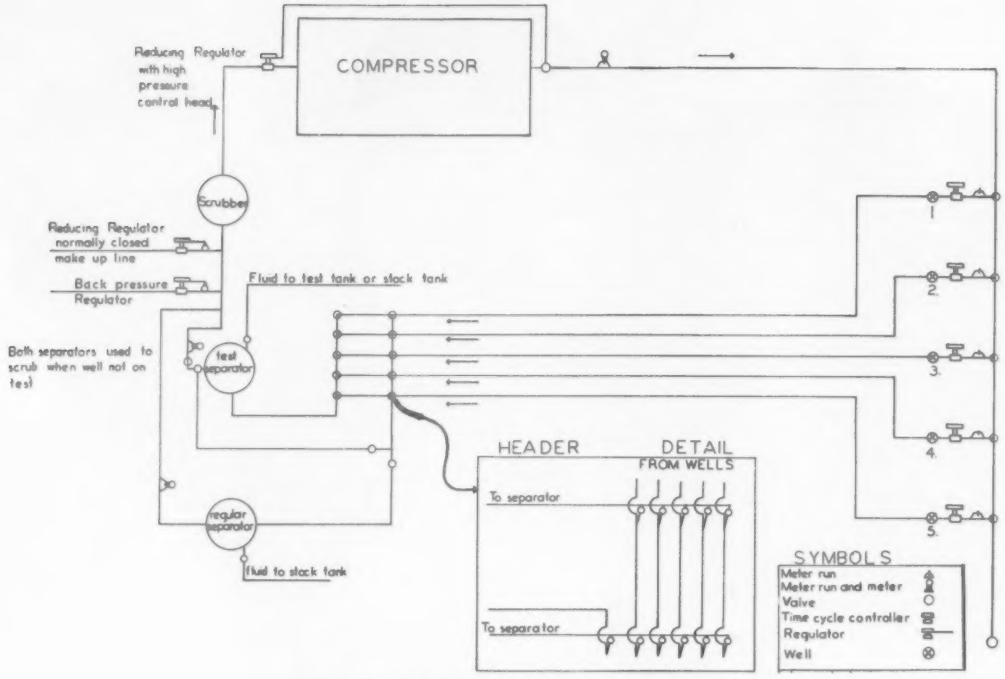


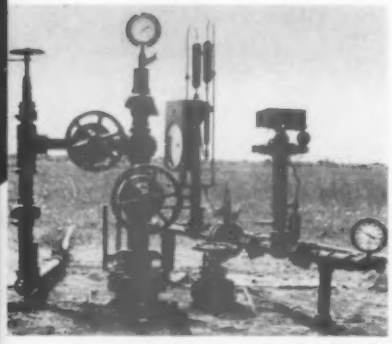
Fig. 1—Layout of typical closed rotative gas-lift system.

Gas-Lift Advancements . . .

. . . in the Gulf Coast Area

Here's a rundown on some of the more recent developments that are making for greater efficiency and economy

by Carlos Canalizo*



A typical installation showing the christmas-tree connections on a well equipped with a retrievable mandrel.

THE Gulf Coast area has been the greatest new source of development of the gas-lift industry. In the past, when the market for natural gas was practically nonexistent, oil companies were not interested in the amount of gas used to produce their oil. The discharged gas was flared, and not much thought was given to its conservation. But recently, the enforcement of gas conservation by the Gulf Coast states, mainly Texas and Louisiana, has been a boon to the development of gas-lift to its present status. Projects that are in the process of development and experimentation will provide greater efficiency and simplicity in producing secondary wells by gas lift in the near future.

In the last year there has been a decided increase in the demand for natural gas. The crosscountry pipe lines distributing gas through the United States have made it possible to sell gas practically any place.

In order for the gas companies to purchase natural gas, it has to be pressured to a minimum of 500 psi. and up to 1,200 psi. on offshore gas. The gas companies prefer to have the gas free of all liquids, such as hydrocarbons and water. In order for the oil companies to sell the gas (ranging up to 12 cents per M.c.f.) they must either sell their gas to gasoline plants, which remove the liquids and compress the gas to salable pressure, or buy their

*Camco, Inc., Houston.

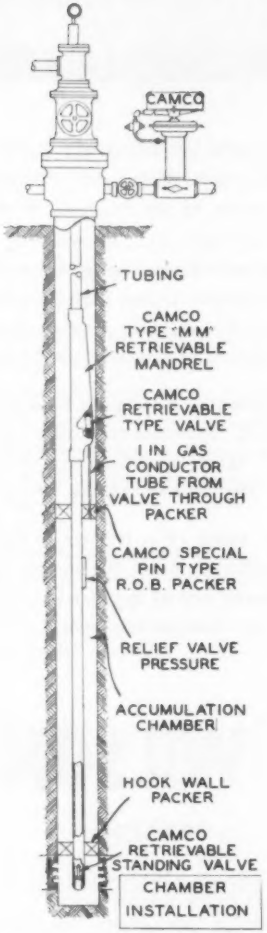


Fig. 2—New chamber-type gas-lift installation.

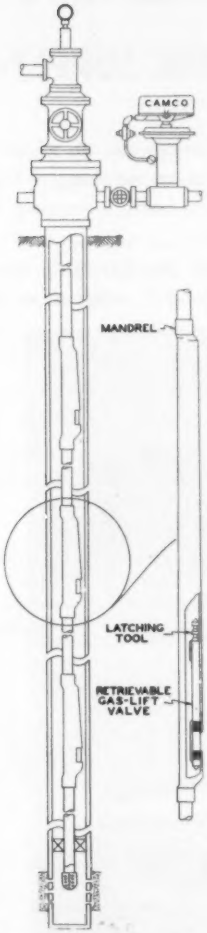


Fig. 3—Retrievable valve installation.

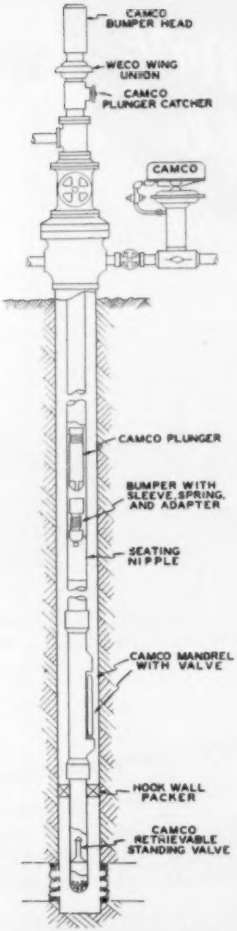


Fig. 4—New type gas-lift plunger.

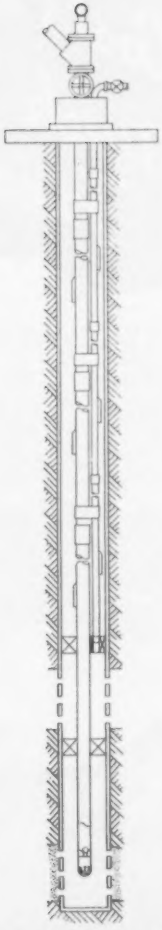


Fig. 5—Dual completion gas-lift method.

own compressor system. If the former is the case, some arrangement is usually made with the gasoline plant where the clean gas is returned to the oil company for gas-lift purposes. If, in the latter case, the operator picks up his gas and compresses and uses it for gas lift, most of the undesirable properties are removed and the discharged gas is acceptable to gas companies. In either case, the gas has been used to lift secondary producing wells, and a great part of the cost of operation has been offset by the sale of the gas.

Gas-company lines, passing in areas where there is no natural source of supply, have made it practicable to install rotative compressor gas-lift systems that are proving very profitable and efficient. Gas is bought from the gas company to charge the field, and when charged, enough formation gas is recovered to maintain the system. In the majority of cases there is a surplus which is sold to the gas company which offsets the original cost of charging the field.

Rotative compressor systems . . . For these, using intermitting-type valves, there was a problem in the past in having to use a larger compressor than would normally be required. This was due to several wells injecting gas at the same time. This can be remedied, wherever an electrical supply is available, by using time-cycle controllers equipped with an electric solenoid. One master time cycle controller capable of handling up to 18 wells can be synchronized so that at no time will there be too much drain on the gas system. Fig. 1 illustrates a typical rotative gas system arrangement. (Electric master time cycle controllers are also very effective in proration of flowing wells. As many as 18 wells can be controlled individually from a central manifold.)

THE AUTHOR

Carlos Canalizo is chief gas engineer for Camco, Inc., with which concern he has been associated for the past 3 years. He attended New York University, where he majored in physics. He was employed by The Texas Co. in South Louisiana for 13 years, 10 years in production, and 3 years in drilling.

Costs Less ... Much More Flexible!

When 250 H. P. or More

WILSON SUPPLY—INGERSOLL-RAND

Photographs on these two pages emphasize the flexibility of Wilson Supply—Ingersoll-Rand "Packaged" Portable Compressors in meeting the needs of the Producer in the field.

For Gas Lifting, Gathering, and Booster work, these installations represent a major initial saving per installed Horse Power, over stationary installations of equal Horse Power.

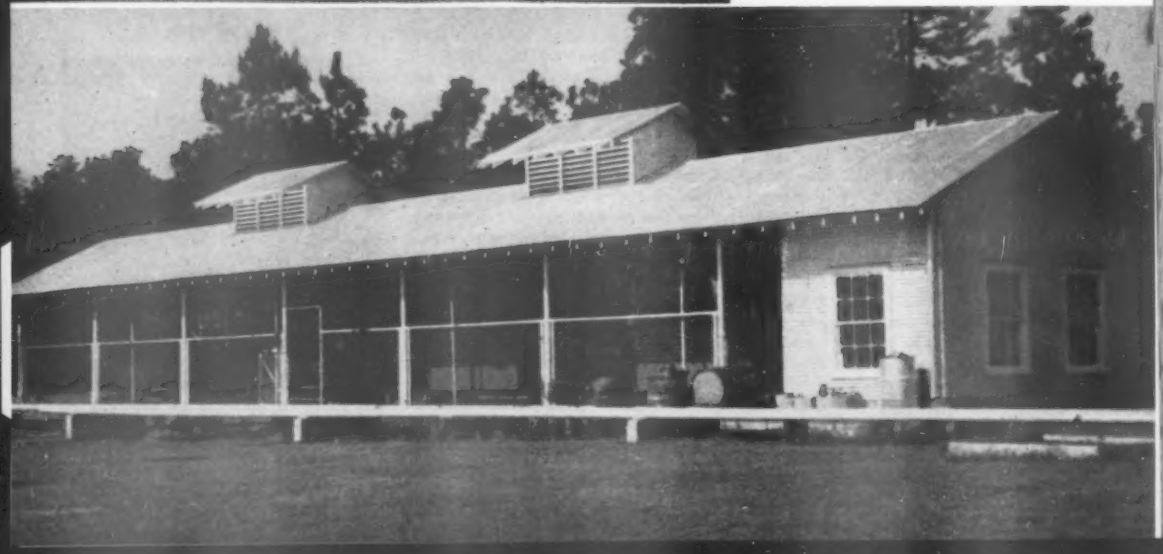
Operated by regular field personnel, maintenance costs are held to a minimum throughout the long lifetime of the Units.

In event of a change in field conditions, these Units may be split and moved to other locations at very nominal expense.

WILSON

Branch Stores

TEXAS: Alice, Corpus Christi, Victoria, Bay City, Columbus, Barbers Hill, Liberty, Beaumont, Kilgore, Monahans.
LOUISIANA: Lake Charles, New Iberia, Houma, Harvey, Shreveport.



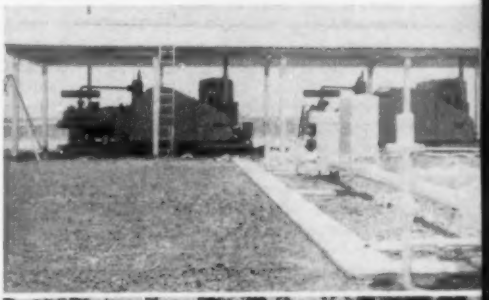
is needed . . . . . Install "Multiple" Units of "Packaged" Portable Compressors.

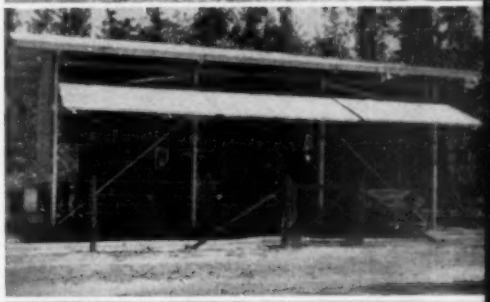
Throughout the Industry — especially in the Southwest the need for Compressors is becoming greater month by month.

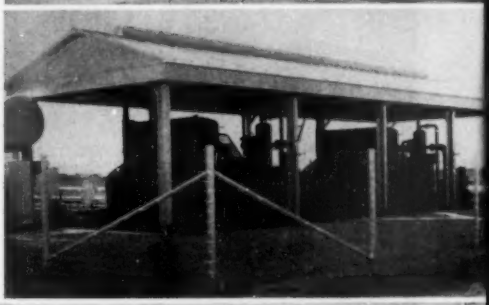
For Gas-Oil Lift, Repressuring, and Booster work, the Wilson Supply—Ingersoll-Rand "Packaged" Portable Compressor has proven its outstanding leadership.

While Wilson Supply Company has many sizes of Compressors in stock or on order — varying field conditions and requirements make it impossible to carry all sizes of compressor cylinders and engines. Therefore the Producer should anticipate his compressor needs as far in advance as possible — so that delivery can be made when the need arrives.

Contact your nearest Wilson Supply Store or write "Compressor Division," Wilson Supply Company, P. O. Drawer 19, Houston, Texas, for detailed information, and quotations. Please give suction and discharge pressure and volume to be handled.







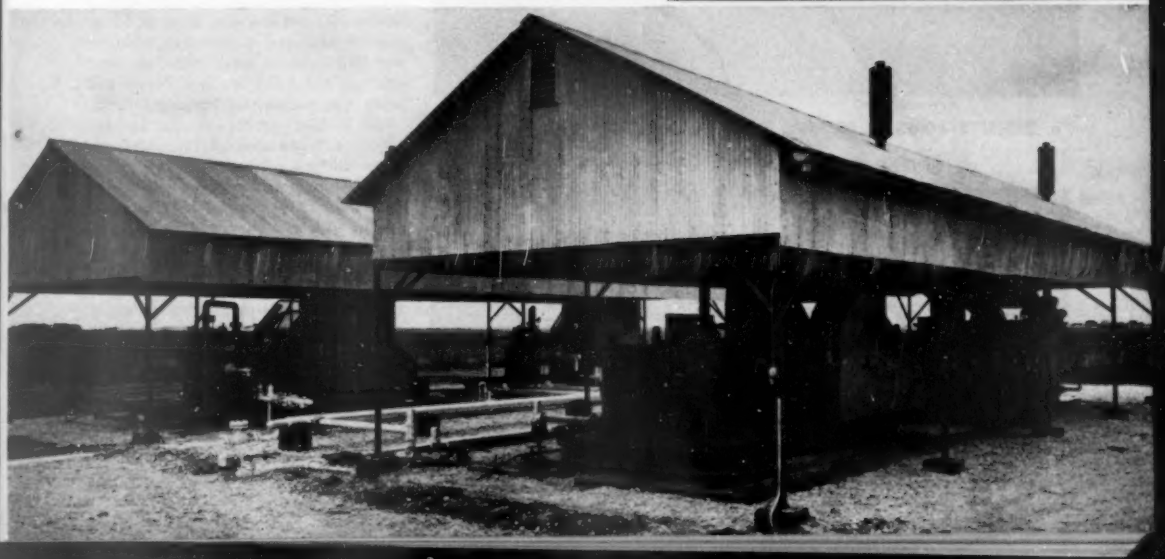
SUPPLY COMPANY

1412 Maury St.

HOUSTON, TEXAS

Sales Offices

DALLAS
TULSA
SHREVEPORT
NEW ORLEANS



"Factors in designing closed gas lift . . ."

The layout of a rotative compressor system is not difficult provided the characteristics of the wells to be lifted are known. Reservoir data taken on the wells during their flowing lives will, in the majority of instances, furnish an accurate prediction of each well's behavior, the type reservoir, and thus the proper method of lift to be used. This reservoir information, however, in some cases may not be available. Therefore, a proper rotative system must be calculated by making numerous assumptions. The amount of fluid desired, the depths from which the fluid has to be lifted, and the back pressure against which the fluid is lifted are the governing factors.

There are many different opinions on whether to install one large compressor unit with sufficient capacity to operate the system, or whether it would be wiser to install smaller units as they are needed. There are advantages and disadvantages to both.

An important factor to consider in the design of a closed gas-lift system is to attempt to balance the amount of gas needed for lifting, with the capacity of the compressor plant. It is very inefficient and costly to operate a large plant at only a portion of its capacity. The consensus favors having a battery of small units, which may be moved in or transferred out in accordance with the field requirements, rather than one single unit which cannot meet the varying demands.

A disadvantage of having a large single unit is that it provides no standby capacity in the event of shutdown. The smaller compressor assists the operator in purchasing only the brake horsepower which is necessary to fulfill his needs. Also, the salvage value of small compressors is greater than that of large units.

Retrievable Wire-Line Valve Mandrel

At the present time, the newest and by far the most versatile development in gas lift is the retrievable wire-line valve mandrel. These mandrels have been used in both Texas and Louisiana and have proved to the oil industry that a new tool has been placed at their disposal. By initial installations of these mandrels, the expense of costly rig operations for oil wells that eventually have to be produced by secondary methods is eliminated. These mandrels make it possible to retrieve selectively any flow valve in the tubing string and still maintain a straight full-bore opening that permits, without impediment, all normal well operations in the tubing string. Bomb runs, paraffin scraping, and even swabbing can be done as in a normal tubing string with the flow valves in place.

With the new wire-line mandrel, an operator can install in his well a piece of equipment that is useful from the completion to the depletion of his well. An example of this would be a well in which a string of wire-line mandrels with blank valve substitutes is installed in the tubing string. It might be necessary at some time in the flowing life of the well to kill it with mud. A blank can be removed from a mandrel in the well, with a small wire-line unit, and two holes 1½ in. in diameter will allow free passage for circulating mud.

At a later period in the twilight stages, a blank can be replaced with a choked flow valve at a predetermined point. This, in combination with a surface controller equipped with a tubing cutoff, acts as a tubing purger, aerating the fluid column as the tubing pressure falls off due to well logging up. This prolongs the life of a well for a considerable period beyond which it would normally flow.

Then, when it becomes necessary to place the well on secondary production, the blanks in the working fluid zone can be replaced with flow valves and the well can be gas lifted until

SEISMIC and GRAVITY SURVEYS on LAND and SEA

• DENSITY LOGS • SEISMIC AND GRAVITY INTERPRETATIONS

A complete service within the organization with the most modern equipment and highly-trained personnel

Tidelands EXPLORATION CO. HOUSTON, TEXAS

2626 WESTHEIMER
LYnchburg 3781

its depletion. In this entire operation, it would be unnecessary to pull the tubing, thus saving expensive rig costs.

Chamber Installation

A new chamber installation has been developed that makes it as simple as installing standard gas-lift valves. The chamber consists of a hook-wall packer, a new pin bypass packer, and a retrievable standing valve and gas-lift valve (Fig. 2). The retrievable standing valve is installed just below the hook-wall packer. The bypass packer is placed in the tubing string above the working fluid level.

The retrievable flow valve and mandrel are installed one joint above bypass packer and a short macaroni string connects the mandrel to the bypass packer. This is run in the hole as a normal operation. The hook-wall packer is set and, as it takes weight (approximately four points, or as previously specified), a pin is sheared in the bypass packer allowing it to set with the hook-wall packer. Then, when the well is ready to be placed in operation, gas in injected in the casing annulus, as in a normal gas-lift installation.

When the pressure is sufficient to open the flow valve, the gas passes into the macaroni string and discharges into the chamber through the bypass packer. This forces the accumulated fluid down the casing annulus and out the tubing string.

It should be noted that there is a full-bore passage in the tubing string down to the standing valve. This is necessary in a chamber installation. Any obstruction causes friction and prevents lifting the fluid at a velocity necessary to maintain the fluid head in a piston-like form with a minimum of aeration and slippage. Also, the only operating parts of the chamber, namely the flow valve and standing valve, can be retrieved with a small wire-line unit, thus leaving the packers undisturbed and saving expensive rig operations.

These retrievable mandrels are being used on offshore operations in well completions. The mandrels are installed in the initial tubing string with the blank valve substitutes. Then, in the future, when it is necessary to place the well on secondary production, the blanks can be replaced with flow valves by a wire-line unit. This type of operation has been done successfully in the Galveston Bay-Corpus Christi areas and also in the Louisiana Gulf Coast areas near the Mississippi River.

New Gas-Lift Plunger

Recently the gas-lift industry has produced a new type gas-lift plunger.

WHENEVER YOU SEE

furnaces like these,

you can be sure

they're* PETRO-CHEM ISO-FLOW *design

More than **1000** *are in operation throughout the world in the petroleum, chemical and allied industries . . . for all processes and for any duty, pressure, temperature and efficiency . . . and all Petro-Chem Iso-Flow furnaces are pre-eminently satisfactory.*

PETRO-CHEM ISO-FLOW FURNACES

UNLIMITED IN SIZE . . . CAPACITY . . . DUTY

PETRO-CHEM DEVELOPMENT CO., INCORPORATED

122 EAST 42ND STREET, NEW YORK 17, N. Y.

Representatives: Bethlehem Supply, Tulsa and Houston · Flagg, Brockett & Durgin, Boston · D. D. Foster, Pittsburgh · Faville-Levally, Chicago · Lester Oberholtz, California · Gordon D. Hardin, Louisville, Kentucky

LEADING COMPRESSORS HAVE

Manzel FORCE FEED LUBRICATORS

Fuller rotary compressors at J. M. Huber Co., showing Manzel Model 94 Lubricators.

Why it Pays to Select Manzel Lubricators

THEY LENGTHEN THE LIFE OF MACHINERY
Perfectly engineered lubrication adds years of trouble free service.

THEY REDUCE "DOWN TIME"
Machinery is lubricated while in operation.

THEY CORRECTLY LUBRICATE EACH POINT
Separate pumping units for each point to be lubricated.

THEY PUMP AGAINST HIGH PRESSURES
Models available for pressures up to 20,000 lbs.

WHEN oil industry compressors, pumps, engines, and other machinery are equipped with *Manzel* Lubricators, you *know* each wearing point will *always* receive exactly the amount of oil it needs. 'Manzels' possess a fifty year record of dependability and accuracy in Force Feed Lubrication. They don't forget or make mistakes. Thus, Manzel equipped machinery operates efficiently for many more years.

Manzel Force Feed Lubricators are furnished as standard equipment on many of the leading makes of diesel, gas, and steam engines, compressors, pumps, and other heavy machinery. Or they can be installed on your present equipment. They may be synchronized by ratchet or direct lever drive, or operated by a separate electric motor.

We will gladly have a Manzel lubrication engineer submit recommendations without obligation. Just write . . .

Manzel 336 BABCOCK STREET • BUFFALO 10, N.Y.

"Dual completion gas lift at Hull, Tex."

Its simplicity of design and method of operation have eliminated the faults that were encountered in the old-type plunger.

The plunger is a tubing traveling valve, separating the fluid head from the injected gas charge, in order to prevent slippage in lifting low-gravity oils, emulsified fluids, and low-productivity wells. The plunger is used in conjunction with gas-lift valves, operating from formation or injected gas.

The manner in which it operates is quite efficient, as slippage is brought to a minimum and the proper fluid head has to be above the plunger for it to carry the fluid to the surface. If the period of injection and cycling is set to compensate for the required fluid buildup, the plunger is closed and the gas entering the tubing string under it forces the plunger with the fluid to the surface. On reaching the surface, the hydrostatic pressure exerted on the plunger by the fluid head decreases as the fluid enters the flow line and the plunger opens, allowing the gas to pass through it clearing the fluid out of the eductor tube to the separator. The plunger, having released the gas charge, has stopped moving before entering the christmas tree and, with no means of support, falls down the well until another fluid head builds up and the cycle is repeated.

An installation of this type near Danberry, Tex., (Fig. 4) has increased the oil production considerably above what it was on standard gas lift, with a considerable decrease in gas-oil ratios.

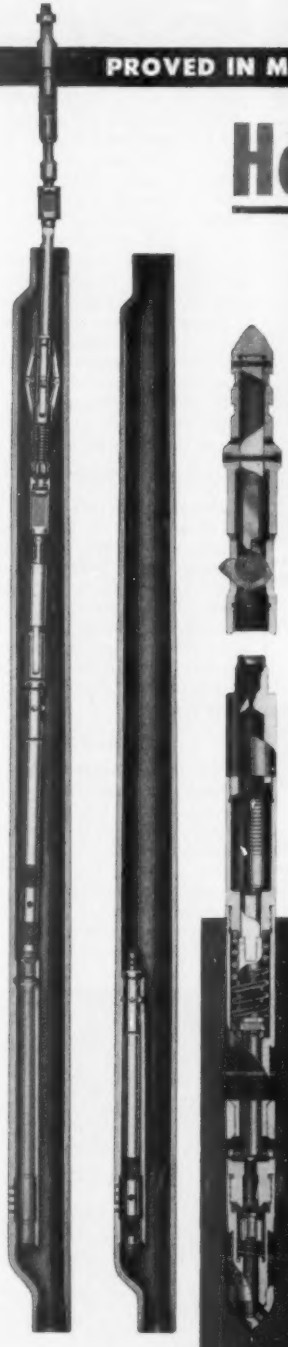
Dual-Completion Gas Lift

Another type of installation that has been successful is a new dual-completion gas-lift method installed at Hull, Tex. A packer was installed between the two producing zones (Fig. 5), and through this packer a perforated 2-in. stringer was run and seated. The lower sand produced through this stringer and into the 2-in. tubing.

A new shear-pin packer with dual-flow passage was inserted above the upper producing zone, isolating both producing zones from the casing annulus. The upper zone flows through a 1-in. tubing string. Fluid operated flow valves were used so that, regardless of where the working fluid level of each zone would be, the valves would have the same gas pressure in the casing. This installation also permitted paraffin scraping in each flow string, which cannot be done in the old-type dual completion.

PROVED IN MANY WELLS!

How to save the cost of pulling tubing on gas lift wells



With Camco retrievable mandrels installed in your tubing string, any Camco retrievable valve may be placed or removed **in any selected mandrel** . . . at any depth . . . without disturbing any of the other valves in the string and **without pulling a single joint of tubing.** In operation, Camco retrievable equipment functions identically to the respective Camco gas lift valves, and allows a free, unrestricted flow through tubing.

It will pay you now and in the future to get the full story of Camco Retrievable Gas Lift Equipment. Ask your Camco Representative or write for your free copy of the new Camco catalog.

CAMCO LEADS THE GAS LIFT FIELD,
NOW AND IN THE FUTURE.

CAMCO, INC. - 7315 Canal St.
Houston, Texas

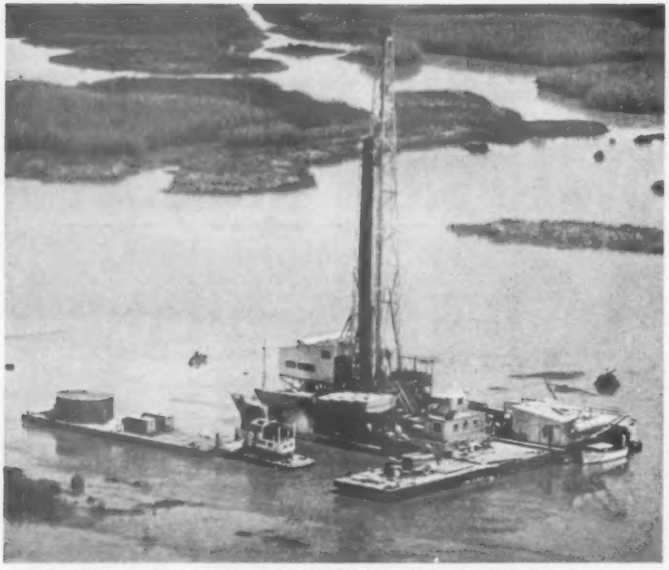
Export Representative:

INTERNATIONAL GAS LIFT, S. A., APARTADO 3249, CARACAS, VENEZUELA

CAMCO

RETRIEVABLE GAS LIFT EQUIPMENT

is the answer!



AERIAL VIEW of Calco marine workover drilling barge in Romere Pass field showing perforating truck barge in foreground, steam-generator barge at left, and cementing barge at right tied up alongside rig.

Workover Barge Restores 1.3 Million Barrels Crude Per Year

by Joseph A. Kornfeld
District Editor

RESTORATION of crude-oil production in excess of 1.3 million barrels per year at a total operating expenditure of $455,000 is the record of the only company-owned marine workover rig operated by The California Co. The barge and rig were purchased at a total cost of $206,201. It is used throughout the bay and delta properties of the firm in South Louisiana.

This rig has completed on the average of 37 workovers annually during a period of 3 years. During 1948 the production restored by this single workover rig surpassed all new production obtained by any individual standard drilling barge contracted by the company.

One alternative would have been to use a large drilling barge at an operating cost fully twice that of the present workover barge; however, this would take the drilling barge out of developmental service which would delay addition of new production. To contract the services of another marine workover rig, which is in short supply, would have occasioned expense delays.

Calco purchased the barge in November 1945. Equipment was installed and the rig operated on a contractual basis until December 1946. At that date, Calco purchased the rig, and obtained an immediate saving of $141 per day in the daily operating cost.

Rig Description

The marine workover rig is equipped to do any type of well remedial job despite the fact that it is smaller than ordinary marine drilling rigs. Segments of this rig comprise a jackknife derrick, standard draw works, rotary table and hoisting equipment, three large internal-combustion gas engines, two mud pumps, and complete mud circulatory system. A wire-line reel is independently powered.

Rig Arrangement

The rig is arranged compactly on a keyway-type barge 30 ft. wide; thus it permits easy moving from one well to another through the narrow canals which are typical of the Gulf Coast bayou country. The barge is so constructed that it straddles the piling keyway and centers the rotary table over the well head itself. Once the barge is placed in position, the seacocks are

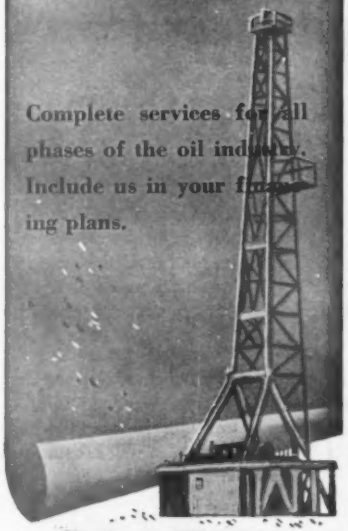
SETTING TUBING SLIPS while going into the hole on a workover job. Crew from left are: W. A. Punch, L. A. Pellegrin, M. Boudreaux, rotary helpers; R. L. Pierce, driller, is at the controls.

DERRICK MAN AT WORK in a jackknife mast rerunning a string of tubing on a workover on the Calco marine workover barge.

SOUTH TEXAS NATIONAL BANK OF HOUSTON

Oil Production Loans

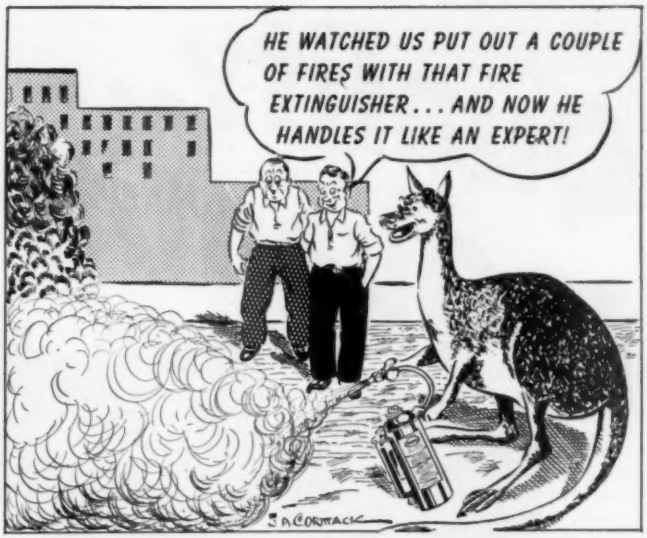
Complete services for all phases of the oil industry. Include us in your financing plans.



SOUTH TEXAS NATIONAL BANK

213 MAIN STREET • HOUSTON, TEXAS

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION



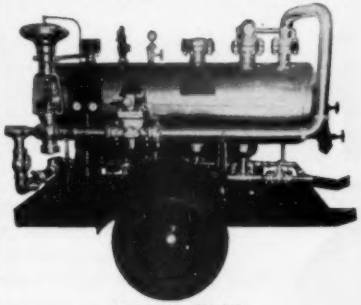
Actually, we have no records of kangaroos using Ansul Extinguishers . . . but we know children of grade-school age can use them effectively. Ease of operation and near-expert results by inexperienced operators have influenced many large companies to standardize on Ansul Equipment.

Ansul Extinguishers are also easy to recharge and maintain. They may be recharged at the scene of the fire without using any tools . . . not even a screwdriver or wrench is needed. Water-tight construction and corrosion resistant construction assure long life with a minimum of repairs.

SEE PAGE 334

ROLO WELLCHECKERS

PERMANENT AND PORTABLE SEPARATORS FOR METERING OIL AND GAS



ROLO No. 6H—2406
6'0" s. to s.; 24" dia.; 600# w.p.; 1450 bpd. oil; 9000 MSCFD gas; 600 bpd. water.

This compact Wellchecker has facilities for metering both oil and gas. A tie-in line permits rejoining oil and gas after metering, if desired. No. 6H—2406 can also be furnished with automatic water knock-out to remove and meter free water. Unit simplifies periodic well tests, gas/oil ratio tests, drill stem and potential tests. See Composite Catalog or write for Illustrated Bulletin No. 1951-W.

Crude Oil Metering Specialists

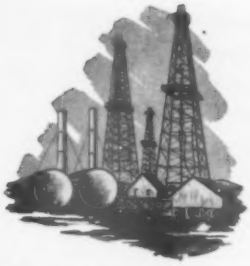
ROLO MANUFACTURING COMPANY

2510 South Blvd., Houston 6, Texas

Branches: Corpus Christi, Midland, Kilgore, Tulsa, New Orleans, Los Angeles, Casper, Calgary (Alta.), and Petroleum Industry Consultants, Apartado 1953, Caracas, Venezuela.

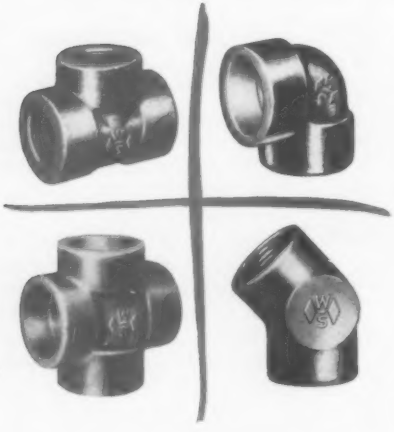
EXPORT OFFICE: R. S. Stokvis & Sons, Inc., 17 Battery Place, New York, N. Y.

Quality... in Quantity



W-S Forged Steel Fittings

SCREW-END and SOCKET-WELD TYPES



Wherever petroleum is produced, processed, or conveyed, Watson-Stillman FORGED Steel Fittings mark the lines to lower operating cost and higher profits.

Quality—in Quantity—has earned and sustained the Watson-Stillman position of first-to-see when industry seeks a solution to a specific fittings problem. Despite an enormous increase in the use of its low *service* cost fittings, Watson-Stillman has never relaxed its concern for the metallurgical aspects of product development.

First to identify itself with the establishment of standards for the properties of special purpose fittings alloys, Watson-Stillman technicians continue in close association with the engineering research efforts of a score of basic industries . . . will be glad to lend a hand on *your* next fittings problem.

9-M-3

• Stronger • Smaller • Lighter • Tighter
• More Uniform • Lower *Service* Cost

SOLD THROUGH LEADING DISTRIBUTORS . . . EVERYWHERE

DISTRIBUTOR PRODUCTS DIVISION

ROSELLE, NEW JERSEY

WATSON-STILLMAN
ESTABLISHED 1848

Designers and Manufacturers of Forged Steel Fittings, Wire Rope Shears, Hand Pumps, Jacks, Pipe Benders and Hydraulic Equipment

opened, and the barge is sunk, usually in about 8 ft. of water, to form a stable working platform.

This Calco-manned marine rig is directed by S. C. Biggs, drilling foreman. The rig is operated by three five-man crews, each of which consists of a driller, a derrick man, a motorman, and two rotary helpers. Frequently, the crew is supplemented by one or two engineering trainees who gain practical field experience as a part of their training program.

Workover jobs may be classified as follows: (1) reworking producing sand, (2) recompletion in other pays, (3) equipment repair, (4) gas-oil ratio control, (5) final plugging, and (6) conversion to salt-water-disposal wells.

The rig has been used also for drilling shallow wells for salt-water-disposal purposes.

Review Case History

A recent specific workover may be cited as an example of the type of work conducted with this rig. When the well in question ceased producing from the sand in which it was completed originally, Calco decided to recomplete the well in a shallower oil sand.

Company-owned "sea mules" were used to move the workover rig to the location of the new workover. The barge was sunk, the christmas tree removed, and the blowout preventers were hooked up. Tubing was then pulled and a cast-iron cement retainer was run in the casing below the sand to be perforated. Fifty sacks of cement were pumped and squeezed below the retainer to seal off effectively the bottom part of the well. Gun perforator was then lowered into the well, and a 4-ft. interval perforated with a density of four shots per foot.

Following this step, a magnesium retainer was set in the casing above these perforations, and a cement squeeze job conducted.

After the cement had been allowed to harden, that portion remaining in the casing was drilled out. A 6-ft. interval opposite the oil sand was perforated with six holes per foot. Tubing was run on a production packer and set above these completion perforations. Initial flow gage was at the rate of 216 bbl. of pipe-line oil per day.

The entire workover job was done in only 3 days at a cost of approximately $9,500. Its output resulted in the equivalent of a new oil well since it produced from another oil reservoir.

Recompletion in other pays . . . In the Gulf Coast, it is very common for one well to penetrate several producing sands. Standard practice is to produce from the lowermost of a series of pay sands until it is depleted. Then a workover rig is moved in to seal off the producing pay and recomplete at successively higher pay zones. Involved in this type of workover are plugging off the sand to be abandoned, perforating the casing at the next higher producing sand, and completing with necessary equipment.

Reworking producing sand . . . One important type is reworking a producing sand. To correct excessive gas-oil or water-oil ratios, the original perforations may be cemented off and the sand reperforated in another section. Gravel packing against a sand face may be employed in order to prevent or reduce the amount of sand produced with the oil. Plastic may be squeezed into the formation to consolidate loose sand. Frequently mud acid is employed to increase the productivity of the sandstone pays.

Acknowledgment

Acknowledgment is made to The California Co. and R. W. Cassingham, petroleum engineer, Gulf Coast division, The California Co., for above information.

Smith Point Field Boasts Unusual Production Facilities

by S. J. Mathews, Jr.,* and T. G. Sinclair*

This Gulf Coast field, located in the shallow waters of Galveston Bay, has produced over 4,000,000 bbl. of oil. Operators have a worthy program for avoiding waste of casing-head gas.

SMITH POINT field is located in the open waters of Galveston Bay, Chambers County, Texas, at a point some 3 miles from Smith Point, the nearest land location. Discovered in January 1944, to date 19 wells have been drilled, 6 of which have been dry holes. While one well has been drilled for exploratory purposes down to 13,000 ft., oil production is limited to an 8,100-ft. Frio sand, and gas production is limited to a 9,400-ft. lower Frio sand. Standard Oil Co. of Texas is the only operator in Smith Point field.

Production History

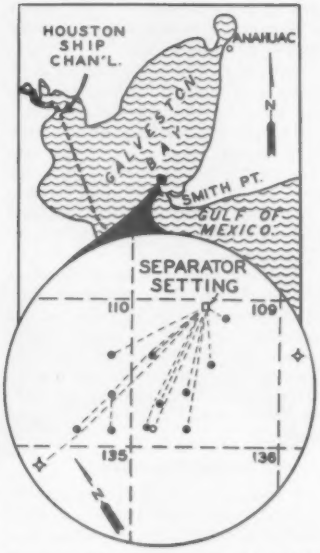
Production to date has been in excess of 4 million barrels of black oil, averaging 40.6° A.P.I. gravity. This has come from the Frio producing formation, having an average net thickness of 15 ft. The pay section has an average porosity of 30 per cent, and an average permeability of 2,670 md.

This production until just recently was brought by 2½-in. gathering lines to a central separator battery installed offshore on a piling platform. The separated casing-head gas was then flared in quantities which finally approached 800 M.c.f. daily.

The liquid production for the field, comprising oil and some water, was then transported by a 6-in. pipe line for a distance of 11 miles across portions of Galveston Bay and Trinity Bay to the Cedar Point terminal. This plan was adopted due to the inaccessibility to the land areas of Smith Point.

At Cedar Point the liquid production was directed through separators, free-water knockouts, and heater-treaters. The oil then went into the 6,000-bbl. storage facilities provided at Cedar Point for Smith Point production. Ultimately, the accumulated Smith Point oil was carried by pipe line to the Oak Point terminal located a few miles away, which has 30,000 bbl. of storage capacity for Smith Point production. The Oak Point terminal has barge-loading facilities, and the oil was finally directed by barge to the Texas City refining area.

At the present time there are 10 oil wells producing from the 8,100-ft. sand. Six of these are flowing, four are on gas lift, and one has been shut in because of the high water production. There are also two gas wells drilled to the lower 9,400-ft. sand. Until recently both of these were shut in because there were no outlet facilities for gas production. However, one of the gas wells is now being utilized as a supply source for the gas-lift oil wells, as will be described below.



SMITH POINT FIELD is located in Galveston Bay just off Smith Point.

All the wells in the field (both oil and gas wells) have been drilled on a 40-acre spacing arrangement. The current field allowable (March 1952) stands at 1,137 bbl. of oil daily.

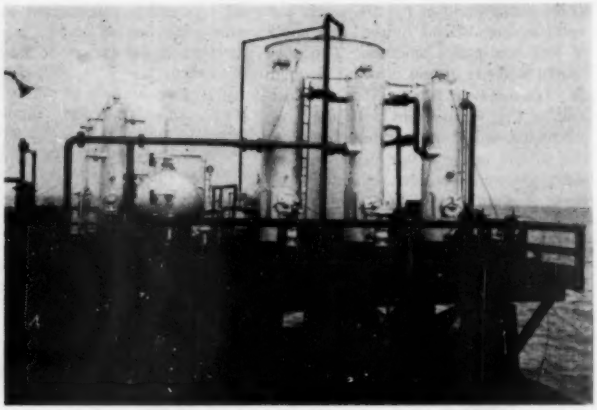
Gas flaring problem . . . In the early days, the flaring of casing-head gas was standard practice because of the limited market demands. With the development of large gas-transmission systems, brought about by increases in gas prices and the growth of markets, gas-conservation programs could be based on realistic criteria.

In the Gulf Coast region of Texas and Louisiana much of the production comes from wells located in swamps, marshes, lakes, and bays. The terrain and marine engineering problems which are encountered are a hindrance to production and to drilling operations. This is especially so with respect to the installation of production equipment on piling platforms and to the laying of gathering and production pipe lines. As an example of the latter, reference can be made to the large quantities of casing-head gas which are currently being flared because of the prohibitive

CENTRAL PLATFORM of Smith Point field shows heaters and regulators in right foreground. Production facilities are seen in the background. Fig. 1.

*Standard Oil Co. of Texas, LaPorte, Tex.

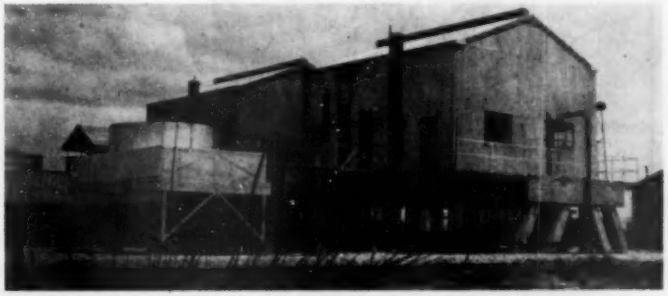
PRODUCTION HEADER located on the central offshore platform. Manifold arrangement is provided for individual well testing. Fig. 2.



PRODUCTION FACILITIES on field platform in Smith Point field show high-pressure vertical separator (left), horizontal three-phase separator (center), and three vertical separators (right). Fig. 3.

cost of installing gathering lines and compressor facilities in fields located in coastal areas.

Smith Point field is a case in point. In this producing area a gas-oil ratio of about 650:1 is typical. Considering the current oil production, this amounts to less than 800 M.c.f. daily casing-head gas production. The question came up, "Was this sufficient to justify the laying of an 11-mile pipe line from Smith Point field to the Cedar Point terminal, the nearest location where compressor station facilities could be installed?" On the other hand, the cumulative production to date of about 4 million barrels of oil, means that about 2,600,000 M.c.f. of casing-head gas has already been flared, and this significant amount pointed to the need to minimize gas flaring.

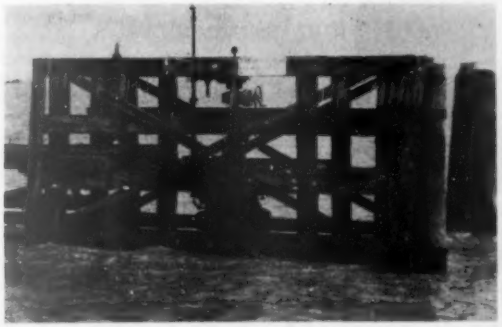


COMPRESSOR STATION PLANTS located at Cedar Point (11 miles from Smith Point) are used for Smith Point and Cedar Point gas production. Fig. 4.

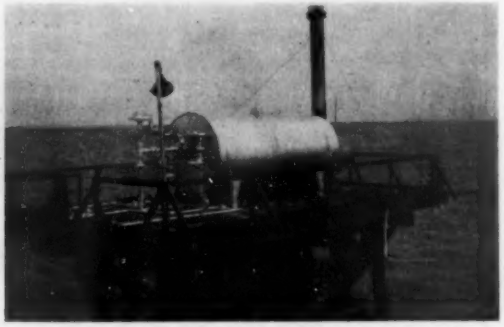
Smith Point plan . . . Operators of Smith Point field have adopted a unique plan to avoid further waste of casing-head gas. The plan can serve as a pattern for others producing and operating in the coastal areas of Texas and Louisiana confronted with the same problem.

As a part of the plan, the production equipment platform in Smith Point field has been enlarged and reequipped as illustrated in Fig. 1. The 2½-in. gathering lines bring the production from the field wells (located anywhere from ¼ mile to 3 miles from the platform) into the header shown in Fig. 2. Production from at least one well is at all times sidetracked through a Rolo test unit, and then recombined with the other production as it all feeds into the Black, Sivalls & Bryson horizontal-type three-phase separator.

Water production . . . The separated water is fed to a skimming tank (shown



TYPICAL WELL HEAD installation in Smith Point field. Fig. 5.



HEATER AND REGULATORS for gas-lift wells. Fig. 6.

in the background of Fig. 3), where the water siphons off the bottom in a more or less continuous manner. This discharge water is in fact directed through an excelsior-type filter. About 75 per cent of the Smith Point wells are now producing water in varying amounts, due to the active water drive, and at least one well has been closed in because it went to 100 per cent water. Current water production is estimated at 3,000 bbl. per day. The disposition of the produced water as described above is to be compared with the way the water was previously left with the oil production and carried by the 11-mile pipe line to shore, back in the days when the gas production was being flared.

A certain amount of oil separates out from the water in the skimming tank, and as this floats to the top (by virtue of the gravity differential) it is periodically pumped off and recombined with the other oil production for transport by pipe line to shore.

Oil and gas production . . . At the point where the 11-mile 6-in. pipe line to shore originates, the separated oil and gas from the three-phase separator is recombined for transport to shore. Check valves are provided to avoid oil backing up in the gas line and vice versa. As noted above, oil which accumulates in the skimming tank is pumped into the pipe line at this point.

The arrangement described above thus shows how gas previously flared is now carried to shore for delivery into a gas-transmission system, and for eventual utilization. Obviously, this same result could also have been accomplished by putting in a separate gas pipe line (probably a 4-in. line) across the 11 miles of bay waters, but the economics would have been prohibitive. This was in spite of the fact that the existing 6-in. line, previously used only to transport the liquid production, had been installed more than 6 years ago. However, the existing line had been taped, wrapped and asphalt coated, and there was no evidence of failure.

At the present time about 2,000 M.c.f. daily of casing-head gas is being taken together with the oil production to shore at Cedar Point. About 800 M.c.f. of this is casing-head gas coming from Smith Point field production, and the rest comes from one 9,400-ft. gas well which is being produced in Smith Point as a gas-lift source. At Cedar Point, the compressor plant shown in Fig. 4 compresses the 40-psi. gas up to 900 psi. for delivery into a nearby gas pipe line.

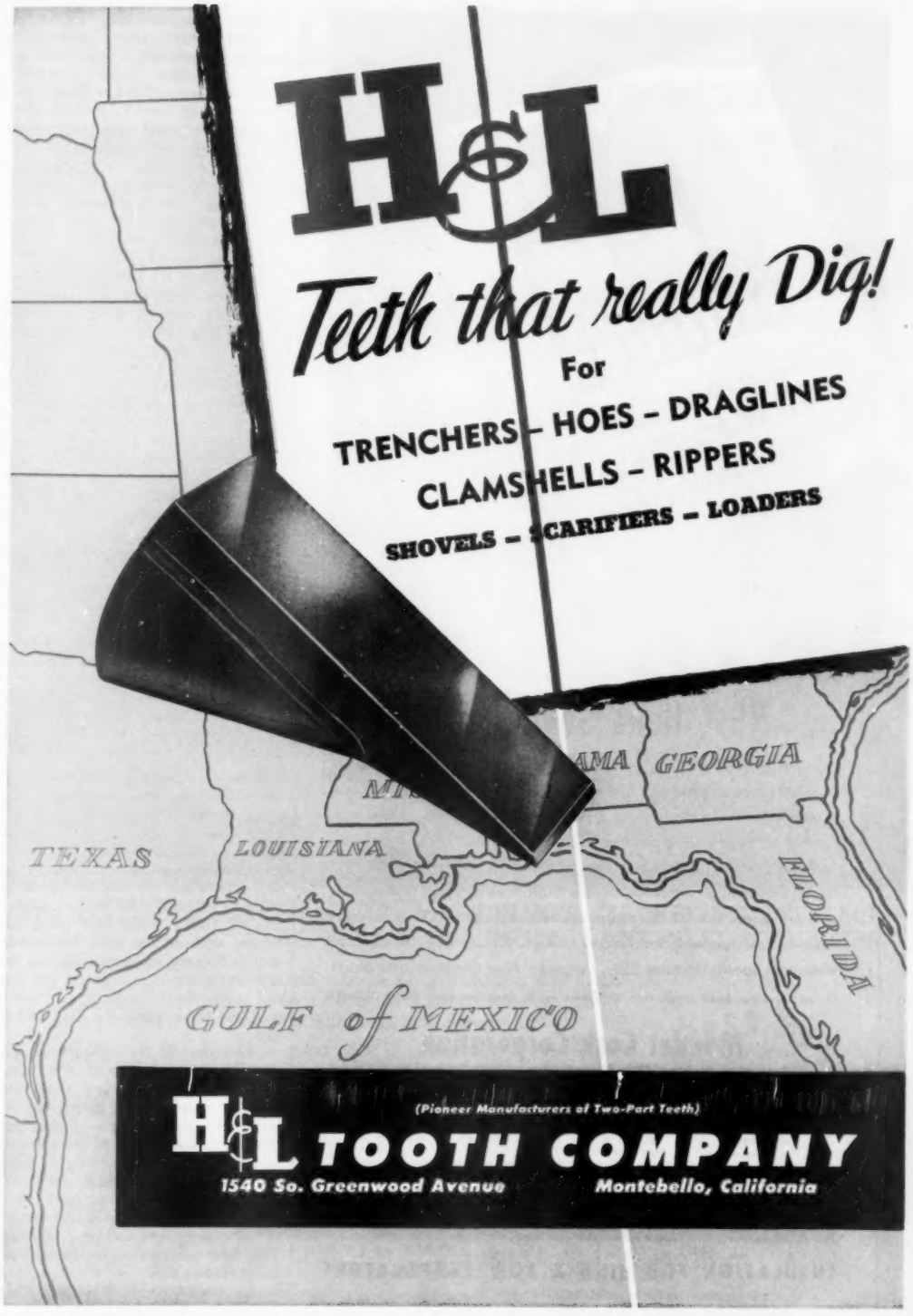
The gas and oil production feed into the 6-in. pipe line at Smith Point at about 160 psi., and delivery pressures 11 miles away at Cedar Point are about 40 psi. While there is some decrease in efficiency in the present system of transporting the gas with the oil over the previous scheme of transporting only liquid production through the pipe line, it has been found that the 6-in. pipe line has adequate capacity to handle current production.

Production at Smith Point . . . A number of production problems arise because of the marine type of conditions encountered at Smith Point field.

Fig. 5 shows a typical well-head installation surrounded by the protective piling. The surface casing is surrounded by a 4-ft.-diameter caisson which is sunk into the bay floor a depth of about 6 ft. Since the water has an average depth of about 10 ft., this results in about 16 ft. of the surface casing being protected by the caisson. As a precaution against corrosion, the annular space between surface casing and the caisson is filled with concrete.

To the left in Fig. 5 is seen a gas lamp which is fueled by gas supplied from a trap in the production string, and which has the purpose of serving as a navigation marker. This type of

MODEL 450-A
SIZES: 3" and 4"
THE SPRING-MATIC
OILCO
Simplifies
all loading
problems
BECAUSE IT HAS GREAT flexibility
in its improved hydraulic and cam design. Simple in operation, compact and sturdy, with a sliding sleeve that may be returned to vertical or semi-vertical position, to permit loading from either side of the rack.
A swing joint allows the dip pipe to hang in vertical position when not in use.
No. 450-A SPRING-MATIC returns upright automatically when raised to horizontal position, and incorporates other features of advantage to insure trouble-free operation.
Interchangeable with weight attachments when specified.
Write NOW for detailed description
OIL EQUIPMENT MANUFACTURING CO.
INCORPORATED
3100 VERMONT AVE., LOUISVILLE, KY.,
Canadian Affiliate: Empire Brass Mfg. Co., Ltd., London, Ontario


H&L
Teeth that really Dig!
For
TRENCHERS – HOES – DRAGLINES
CLAMSHELLS – RIPPERS
SHOVELS – SCARIFIERS – LOADERS
GEORGIA
TEXAS
LOUISIANA
FLORIDA
GULF of MEXICO
(Pioneer Manufacturers of Two-Part Teeth)
H&L TOOTH COMPANY
1540 So. Greenwood Avenue
Montebello, California

. . . NEW Heat Saving Efficiency

MUNDET 85% MAGNESIA INSULATION provides maximum strength and resistance to vibration. Extra durability is built into this insulation. In pipe covering and blocks, it is precision manufactured on the latest type of automatic equipment to insure uniform standards. It does not "powder", settle or disintegrate. It is unaffected by steam or water leakage. It maintains an attractive, smooth finish. Precision pipe fit is assured, with no spaces left for the escape of heat. You benefit from the most modern manufacturing facilities for the production of heat insulation when you specify Mundet 85% Magnesia Pipe Covering and Blocks.

Write for new heat insulation Engineering & Specifications Data Manual.

Mundet Cork Corporation

Insulation Division, 7205 Tonnelle Ave., North Bergen, N. J.

Mundet district offices are located in these cities:

ATLANTA 339-41 Elizabeth St., N.E.
BALTIMORE 30 612 Battery Ave.
BOSTON 57 Regent St., N. Cambridge 40
CHARLOTTE 3, N. C. 507 S. Cedar St.
CINCINNATI 2 427 West 4th St.
DALLAS 10 601 Second Ave.
DETROIT 21 14401 Prairie Ave.
HOUSTON 1 Commerce and Palmer Sts.
INDIANAPOLIS 4 15 E. Washington St.
JACKSONVILLE 6, FLA. 800 E. Bay St.
KANSAS CITY 7, MO. 1401 St. Louis Ave.
KNOXVILLE 1221 Grand Ave.
LOS ANGELES (Haywood) 6116 Walker Ave.
In Canada: Mundet Cork & Insulation, Ltd., 35 Booth Ave., Toronto
NEW ORLEANS 16 315-25 N. Front St.
NEW YORK 17 331 Madison Ave.
PHILADELPHIA 39 856 N. 48th St.
ST. LOUIS 9 3176 Brannon Ave.
SAN FRANCISCO 7 440 Brannon St.

INSULATION FOR HIGH & LOW TEMPERATURE

flare has been found more satisfactory than the electric lamps powered by wind generators which most other operators in Galveston Bay are now using.

All wells are provided with Otis safety valves which close by pressure drop. In addition, all field gathering lines are provided with Meynig valves (also operating on a pressure differential principle). These provisions are made to avoid serious loss of production in the event the production string or the flow lines are broken by tides, ships or other marine hazards.

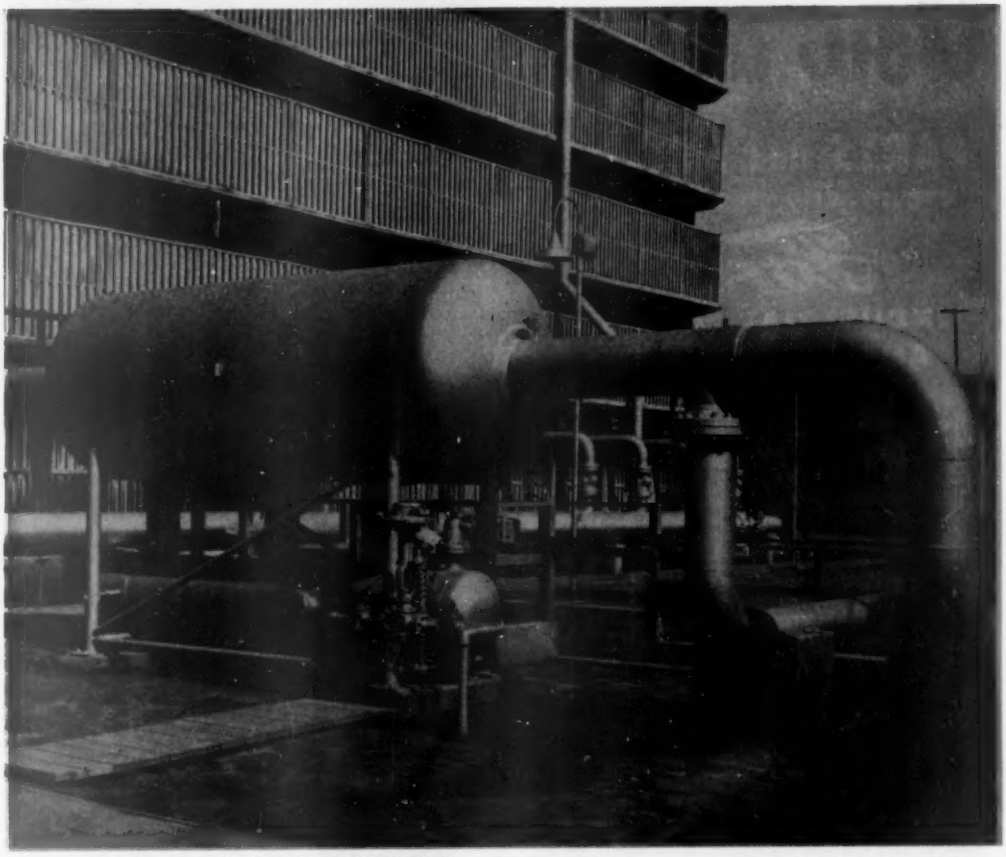
Several (at present four) of the wells in the Smith Point field are on gas lift. Back in the days when the casing-head gas was flared, some of the casing-head gas was utilized for artificial lift. More recently, however, now that the casing-head gas is being brought to shore for marketing, one of the 9,400-ft. gas wells in the field has been employed as a source for gas-lift gas. This well has a shut-in tubing pressure of 3,200 psi., but by virtue of an Otis bottom-hole-pressure regulator (Type "B") the surface flowing pressure is reduced to 1,300 psi.

Fig. 6 illustrates the equipment on the central platform where the gas production, amounting at present to about 1,200 M.c.f. daily, is further reduced in pressure to about 800 psi. by passing through regulator chokes. The gas-fired line heater is to minimize hydrate formation. This gas for gas lift use is then directed through the high pressure vertical separator seen in the left background of Fig. 3 before it is directed by flow lines to the gas-lift wells.

Resume of current gas disposition . . . Originally, the casing-head gas produced in Smith Point field was separated from the oil production by making use of separators located on an offshore platform in the field. While some of the separated gas was then used for gas lift, ultimately all the gas production was flared. There were two 9,400-ft. gas wells in the field which were shut in because economics did not justify the laying of a separate gas pipe line across the 11 miles of bay waters to Cedar Point where the gas could be utilized.

Currently, all the casing-head gas, now amounting to about 800 M.c.f. daily, is brought to shore along with the oil production by having the existing 6-in. pipe line serve a dual purpose. In addition, one of the gas wells in the field is currently being produced at a rate of 1,200 M.c.f. daily as a supply source for the four gas-lift wells in the field, and this gas is also brought to shore along with the gas production. The total gas production from Smith Point field, none of which is now flared, amounts to 2,000 M.c.f. daily.

See PEERLESS FIRST!
For GAS SCRUBBERS...



The **BEST SCRUBBERS** for PIPELINES, GATHERING SYSTEMS, COMPRESSOR STATIONS, PLANT INLET SCRUBBERS

Pictured above is a Peerless 60" O.D. x 15 foot horizontal separator, handling 240,000,000 cu. ft. per day at 350#.

This separator is removing condensed liquid from the cooling tower to prevent moisture accumulation in distribution units.

Consult Peerless for an engineered solution to your most stringent entrainment problems.

PEERLESS MFG. CO.

PEERLESS MANUFACTURING CO.

P. O. BOX 7193 ★ DALLAS, TEXAS ★ DIxon-8431

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Wherever You are...

PARTS and SERVICE are readily available for Ford INDUSTRIAL ENGINES AND POWER UNITS

• Ask any equipment builder what he has found to be increasingly important in selling his product. Or ask the actual operators of industrial powered machinery the things that most seriously affect profitable operation.

Both manufacturers and users will agree on these two points: **(1)** *Ready availability of replacement parts, and* **(2)** *Convenient service facilities.*

Nothing is more irritating to the operator of powered equipment than "downtime" lost in awaiting delivery of parts from some distant warehouse; or locating a good mechanic who knows all about the engine when service is sorely needed.

Equipment builders who specify Ford Industrial Engines or Power Units for their products automatically overcome this problem. And users who are replacing their worn-out engines with new Ford Power have also found this is the right answer.

Because . . . Ford Dealers are located virtually in every city, town and village. There are more than 6400 of them, PLUS independent shops everywhere that also carry Genuine Ford Parts. Wherever you are, Ford Parts and Service are "right around the corner." Yes, experience is fast proving that Ford Industrial Engines, built to Ford's famous high-precision standards, are—

RIGHT 3 WAYS for your job:

Ford INDUSTRIAL ENGINES AND POWER UNITS

1—RIGHT POWER
2—RIGHT FEATURES
3—RIGHT SERVICE

Clip and Mail Coupon Today!

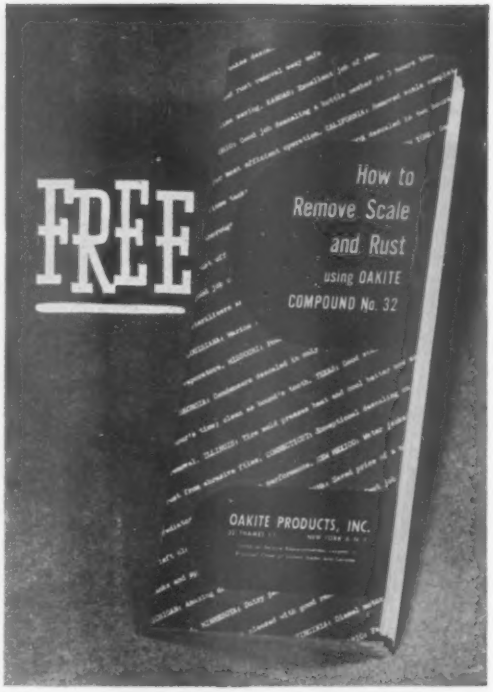
INDUSTRIAL ENGINE DEPARTMENT
FORD MOTOR COMPANY
15050 Woodward Ave., Highland Park 3, Mich.
We are interested in Industrial Power for:

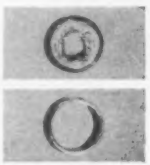
_____
(state your application)

Send us 1952 literature on Ford Industrial Engines checked below:

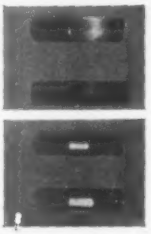
☐ "120" 4-Cyl. ☐ "215" 6-Cyl. ☐ "239" V-8
☐ "254" 6-Cyl. ☐ "279" V-8 ☐ "317" V-8
☐ "MULTA-TORQUE" Converter

Firm Name_____
(Please Print)
Street_____
City_____ Zone____ State_____





Section of pipe before and after descaling with Oakite Compound No. 32



Rusty bolts look good as new after treatment with O. C. 32

Get more production—longer equipment life!

GET rid of crippling scale and rust the fast, safe chemical way—with Oakite Compound No. 32.

This inhibited acid material quickly dissolves scale and rust without attacking sound metal. Much quicker than rodding, lancing, or steaming-out; much safer than raw commercial acids. Cuts down-time—saves equipment.

Use Oakite Compound No. 32 to descale heat exchangers, diesel water-cooling systems, fractionating and absorption towers . . . to de-rust valves, fittings, steel shaft casings, chains, etc.

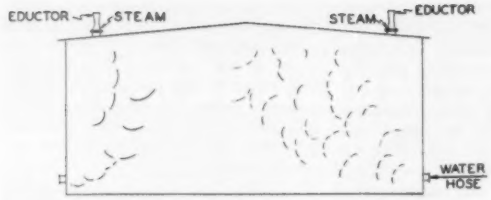
FREE BOOKLET F4305 tells all about it. Ask your local Oakite Petroleum Service Representative, or write Oakite Products, Inc., 44C Rector St., New York 6, N. Y. No obligation.

Technical Service Representatives in Principal Cities of U. S. & Canada

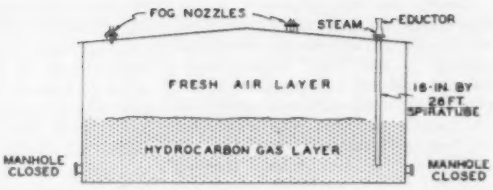
OAKITE

TRADE MARK REG. U.S. PAT. OFF.

PETROLEUM SERVICE DIVISION



GAS FREEING of tankage by Norco's old method is illustrated here (Fig. 1).



NEW METHOD for gas freeing tankage is much faster and assures safer operation (Fig. 2).

How Norco engineers solved the problems of . . .

1. Gas Freeing of Tankage

2. Oil Freeing Waste Water

Rapid and complete removal of hydrocarbon vapors from storage tanks facilities safe maintenance work; effective removal of oil from waste water eases problem of stream polution, increases yields.

by R. G. Stillinger* and B. S. Graves, Jr.*

TWO particularly troublesome problems have been solved by engineers and technicians of the Norco refinery of Shell Oil Co., at Norco, La. The first of these involves the rapid removal of hydrocarbon vapors from tankage after emptying. The second is removal of oil from waste water streams.

Gas Freeing of Tankage

Storage and process tanks generally represent a considerable percentage of the capital investment in refining facilities of an oil company. In addition to high capital cost, maintenance expense and current difficulties encountered in obtaining steel for additions and replacements tend to limit the capacity of tankage available at most locations to the minimum required for continuous operations.

These conditions plus the fact that an empty tank, until gas free, is a potential safety hazard, makes it essential that out-of-service periods for tank maintenance and gas-freeing be limited to the minimum time consistent with safe working procedures and effective removal of hazardous gas-air mixtures.

Since gas freeing is a prerequisite for practically all tank maintenance work, a study of Norco's method was made to determine possible improvements. The method of gas-freeing tanks when this study was inaugurated is shown in Fig. 1. With this method steam ejectors were installed in roof manways and the gas-air mixture drawn from the top section of the tank. The tank shell manways were necessarily opened for fresh-air entry to replace the exhausted gas and for hosing down during the later stages of the freeing operation to release vapors from any bottom sludge.

*Norco refinery, Shell Oil Co., Norco, La.

The time required by this method to produce safe working conditions in a tank varied from to 2 to 3 days depending on the tank service, compared to the new procedure which provides gas-free conditions on the average in about 2 hours' time.

The former method, in addition to requiring more time than necessary to allow for gas freeing, did not give adequate protection against the possibility of hazardous conditions developing from oxidation of iron sulfide deposits. With these points in mind tests were conducted, as tanks became available, to determine an improved procedure.

It was soon discovered that drawing gas from near the bottom of a tank, with fresh air entering through roof manways, resulted in quicker and more effective removal than did removal from the top as by the former method. This change, however, was in the wrong direction as far as minimizing the possibility of oxidation of any iron sulfide deposits present is concerned. With less turbulence, due to the changed location of fresh air intake, it was apparent that sufficient oxygen would be available almost immediately in the top areas of a tank to support oxidation and, of course, create a hazardous condition.

Use of water . . . It was known that water would effectively control the hazard due to oxidation of sulfide deposits; therefore, it remained only to find a dependable and practical means of keeping all inside surfaces of a tank wet during the gas-freeing operation. To determine the best way to do this tests were run in a clean gas-free tank in order that observers could remain inside to check the effectiveness of the wetting operation.

The tank, 78 ft. diameter by 30 ft. high, was equipped with two 2½-in. fog nozzles and one 300,000 cu. ft. per hour eductor mounted in a roof manway and an 8-in. nozzle as shown in Fig. 2. A 16-in. by 28-ft. Spiratube (rubberized fabric wire inserted tube) attached to the eductor was used to pull gas from the bottom area of the tank. Cotton balls were placed under shields and suspended 1-in. under the roof at several locations for checking the effectiveness of the wetting procedure. Manometers were used to determine the vacuum at air inlet manyways in the roof as well as the entrance of the Spiratube.

During the test, observers in the tank could see that the incoming air was passing through the fog sprays and picking up the finely divided water. After 5 minutes of operation of the eductor the tank shell was damp. In 10 minutes the shell was thoroughly wet and in 15 minutes water was running down the tank sides. The fog appeared to be thoroughly distributed throughout the tank. Vacuum in the entrance of the Spiratube was 2¾ to 3 in. of water during the test and ⅛-in. and 3/16-in. respectively in the 24-in. manway and 8-in. roof nozzle.

Cotton balls hung under the roof were moist but the roof, which was unpainted, was wet only where shaded, indicating that the temperature of the steel was sufficient to vaporize water deposited by the fog. Under normal conditions and with white or aluminum-painted roofs, sufficient moisture will remain on the roof to prevent oxidation of sulfide deposits. With unpainted or black tank roofs it is necessary, however, to cool with water, or in some other manner, if the gas-freeing work is to be safely handled during clear summer weather.

Use of the new procedure for gas-freeing tanks, as described above and shown schematically in Fig. 2, has resulted in a reduction of approximately 95 per cent in the time required for this work. Tanks of 55,000-bbl. capacity are now safe to work in after only 1½ to 4 hours of gas freeing, depending on the tank service. Also, the use of water fog has proved effective for controlling the oxidation hazard of iron sulfide deposits until tanks can be entered and the deposits washed down and removed with high-pressure water.

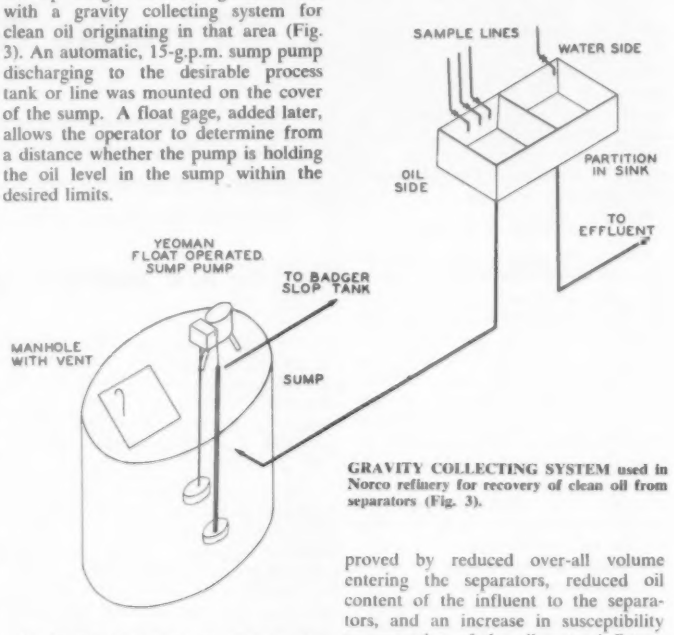
Oil-Free Waste Water

The logical approach to the problem of obtaining an oil-free refinery waste water is to work towards a complete segregation of waste-oil and waste-water gathering systems. In applying this basic principle several years ago an intermediate step, second only to the ideal of keeping all oil inside the processing facilities, was agreed upon. The plan included, wherever possible, the recovery before contamination of all foreseeable withdrawals of hydrocarbons from the processing equipment and their return to the oil flow stream at the most desirable point as dictated by economy and the character of the oil.

Part of this plan—that part which has proved most satisfying—was the installation of clean-oil recovery sumps in the several operating areas. "Clean oil" refers to any relatively uncontaminated oil from crude to finished products which escapes from processing, storage, or transfer equipment.

It has been determined in oil-loss surveys that an appreciable quantity of the oil entering the oil-water separators was originating from scheduled drawoffs in the form of sample oil, tryline oil, flushing oil, etc. This oil was clean and its return to process could be definitely and economically planned since the points of loss and point of return were fairly closely grouped in each operating department. Therefore, six oil-recovery sumps, each of approximately 10 bbl. capacity, were designed for installation in the distilling, cracking, stabilizing, and laboratory areas. Six salvaged vessels, each 48-in. in diameter and 4-ft. 6-in. deep, were obtained.

Each sump was set in the ground, the top being 4 in. above ground level, with a gravity collecting system for clean oil originating in that area (Fig. 3). An automatic, 15-g.p.m. sump pump discharging to the desirable process tank or line was mounted on the cover of the sump. A float gage, added later, allows the operator to determine from a distance whether the pump is holding the oil level in the sump within the desired limits.



GRAVITY COLLECTING SYSTEM used in Norco refinery for recovery of clean oil from separators (Fig. 3).

In installations such as that in the laboratory area where sample oil and water were being poured into a common sink drain, revisions to the sink had to be made. A small portion of the sink was partitioned off to receive oil while the remaining larger portion including the existing drain was allocated to water washing. A new drain from the oil section was provided to connect with the clean-oil sump gathering system.

Funnels receiving tryline oil from operating vessels were also connected to the gathering system in their particular area. In one case a pump-house manifold pit was equipped with an additional drain which entered a clean-oil recovery sump. Normally oil and water mixtures from this pit are directed to the oil-water separator system. However, line connections are frequently opened, allowing clean oil to spill into the pit. Upon such occasions this clean oil is directed to the recovery sump.

A few months following the original six sump installation and after the success of the project was proven, two more such small sumps were placed in service where clean-oil recovery was indicated. Total recovery from all eight sumps has averaged approximately 20 bbl. of oil per day. In addition to the reduction of handling and vaporization loss suffered in the separation and dehydration system, efficiency of oil-water separation was improved by reduced over-all volume entering the separators, reduced oil content of the influent to the separators, and an increase in susceptibility to separation of the oil water influent.

The last of these improvements arises from the well-known fact that mixtures of oils with various characteristics frequently from emulsions with waste waters, particularly process waters. These emulsions, usually formed during transfer to the oil-water separator, are only partially susceptible to mechanical separation.

This relatively inexpensive clean oil recovery system which required a minimum of attention has improved the refinery's final effluent as much as other installations which cost several times as much and require many more manhours to operate.

Combustion Without Smoke

the JOHN ZINK way

John Zink and his engineers solve an old and vexing problem by providing combustion without smoke in the modern Smokeless Field Flare Burner.

JOHN ZINK CO.

4401 So. Peoria
Tulsa, Oklahoma

WELL CONTROL MANIFOLD . . . This Kirby field photo also shows hookup for chokes, intermitters on the input gas line, and separators.

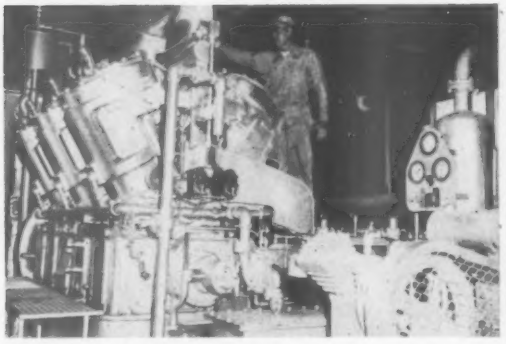
Secondary Recovery at Kirby Showing Excellent Results

by W. D. Mason, Jr.

A SECONDARY-RECOVERY project has been undertaken in Kirby field, Liberty County, Texas, by General Crude Oil Co. since February 1949 and the results have proved to be very satisfactory to date. The field is located on the southwest flank of Esperson Dome and has 415 productive acres.

The first producing well at Kirby was completed in June 1943 and 14 additional wells were drilled through 1946. There have been eight additional dry holes drilled which aided in outlining the producing reservoir. Two of these wells are now being used for water injection, and three of the former producing wells are being used for gas injection.

Geology . . . Kirby field is a wedge-shaped segment that has been tilted up by the intrusion of the salt plug. It is bounded by faults on the north, east, and southwest. Production is from the intermediate Yegua sand, the top of which is found at depths ranging from 5,960 ft. on the northeast to 7,840 ft. on the southwest giving a dip of 33° and a closure of 1,880 ft. The three major faults enclosing the field have been fairly well established,



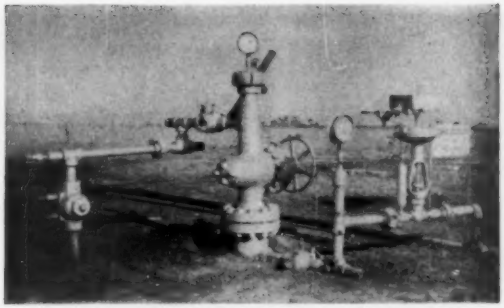
COMPRESSOR STATION . . . This plant serves three gas-injection wells.

INTAKE TO COMPRESSOR PLANT . . . View shows casing head and makeup supply, with regulating and metering equipment.

GAS-INJECTION WELL . . . Operating policy is to convert producers to gas input when they build up to over 8,000 gas-oil ratio.

WATER-INJECTION SUPPLY . . . This pumping unit does the job; separator appears in the background.

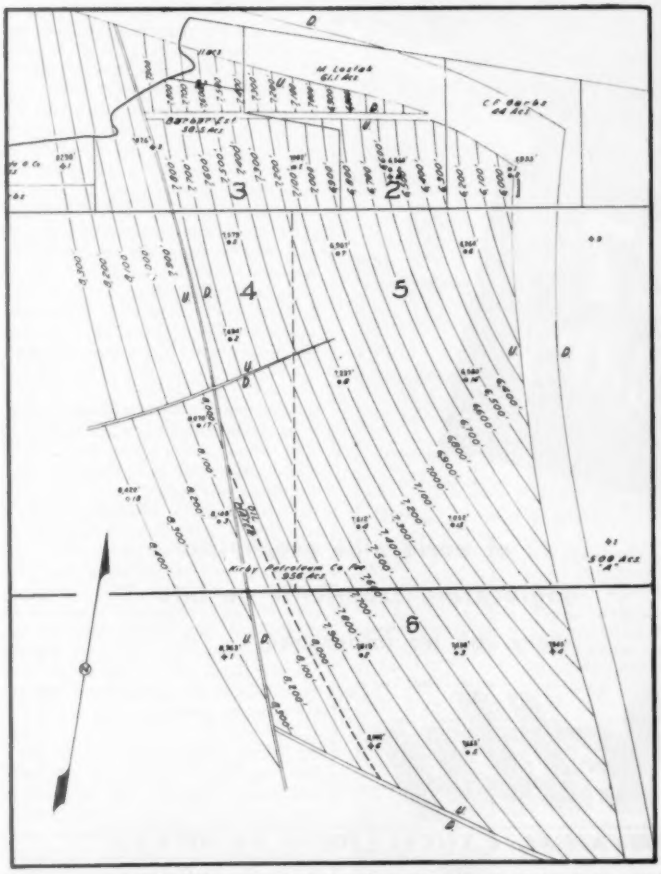
SALT-WATER INJECTION WELL . . . and showing G. B. Kennedy, field foreman for General Crude Oil Co.



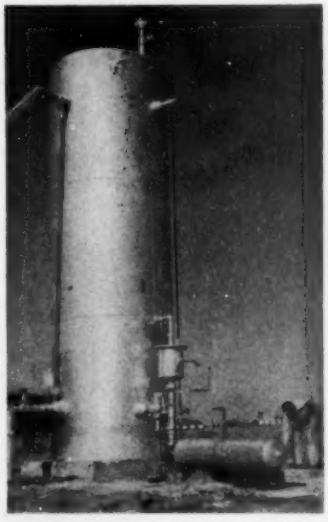
PRODUCING WELL AT KIRBY . . . A typical installation, equipped with gas lift which is mainly used for kickoff purposes.

but the presence of minor faults within these boundaries has not been determined. It appears that the sand section is continuous but it is possible that there may be unconnected lenses of varying thickness and continuity.

The net productive pay in the sand section varies in thickness from an average of 15 ft. through the central section of the field running from northeast to southwest with a rapidly thinning development on the north to 6 ft. and to the south to 10 ft. The texture of this sand is variable with an average permeability of 100 md. and a porosity of 26 per cent. The oil-water contact was determined at 7,860 ft. from electric logs of wells along the southwest perimeter.



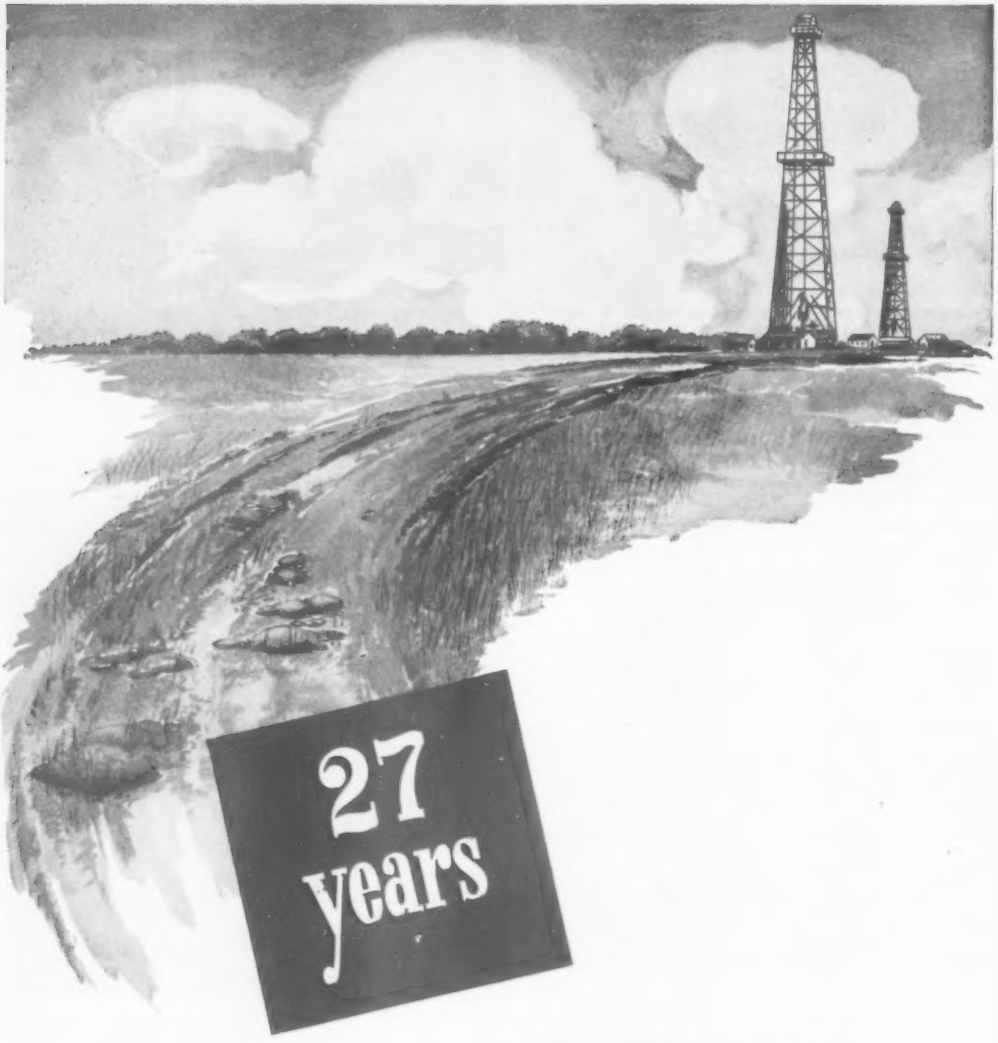
Structure map of Kirby field, contoured on top of porosity using electric-log depths which refer to 1 ft. above rotary bushing.



SALT-WATER SEPARATOR . . . and volume tank. A half pound of gas pressure is held on this vessel to keep out all oxygen.

THE AUTHOR

W. D. Mason, Jr., is reservoir engineer with General Crude Oil Co. He attended Lehigh University, studying petroleum engineering. After leaving school, he joined Sun Oil Co. and worked in drilling, production, and pipe lining in Texas and Louisiana. In 1939, Mason left Sun to join General Crude as field engineer. During the war he served as a lieutenant commander in the Navy with duty which included a tour with the petroleum division of the Navy Department. After the war, he returned to General Crude.



. . . of world-wide geophysical engineering experience go into every job we undertake.

Petty

GEOPHYSICAL ENGINEERING COMPANY

SAN ANTONIO, TEXAS

SEISMIC • GRAVITY • MAGNETIC SURVEYS

Development and production . . . To July 1, 1947, the field had produced 717,000 bbl. of oil or about 13 per cent of the original calculated oil in place. The original bottom-hole pressure had declined from 3,400 psi. to an average of 2,050 psi.

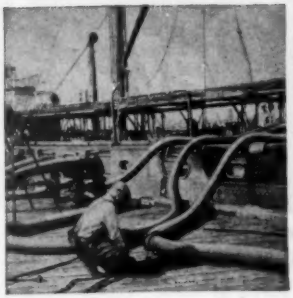
The energy to produce this field appeared to come mainly from dissolved gas expansion and to a certain degree from gravity drainage. The presence of a fault on the southwest side was further corroborated by the absence of any appreciable water drive. A definite gas cap was not present under original conditions but performance indicated the formation of one at structurally high wells under reduced pressures. It became necessary to reduce the oil production in order to maintain bottom-hole pressure and prevent waste of the gas energy. Gas lift was necessary on practically all the wells.

It was decided at this time to unitize this field and inaugurate secondary-recovery operations. A reservoir study was made by a disinterested consultant and the working interests and royalty owners were unitized on the basis of his report. Permission was granted by the Railroad Commission of Texas to conduct secondary-recovery operations in this unit and the injection of gas was instigated in January 1949. Water injection in two dry holes which were slightly below the oil-water contact was started a few months later. Since the unitization, an additional 500,000 bbl. of oil has been produced from this field with no appreciable change in bottom-hole pressure. The produced gas which was formerly vented is now being reinjected into the top of the gas cap.

Surface equipment . . . The unitization agreement allowed the consolidation of all lease equipment into a central tank battery and this was done immediately. Flow lines from wells were brought to a central manifold where the chokes, intermitters to the input lines, and separators were arranged to operate each well at the most efficient rate of production. This manifold allowed the separation of the pipe-line oil, cut oil, and also provided facilities for individual well tests. Any well can be switched into any of the various separators depending on whether it is making pipeline oil, cut oil, or being placed on a test.

All the produced gas is picked up from the separators at 100 psi. and returned to the 225-hp. compressor, together with makeup gas from another segment of Esperson Dome and compressed to an injection pressure of approximately 3,000 psi. By means of a back-pressure regulating system,

HEWITT-ROBINS



FOR FASTER TANKER TURN-AROUND

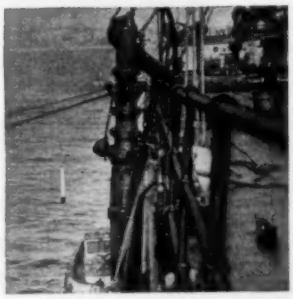
Hewitt-Robins Monarch® Oil Suction and Discharge Hose

Save up to 50% in loading and unloading time. Smooth bore, oil resistant innertube (originated by Hewitt-Robins) cuts friction resistance to a minimum . . . drains clean, as there are no wire "fuel traps" inside.

Prevents nipple leakage—Special Hewitt-Robins Durabond® process assures perfect adhesion of tube to metal . . . tube can't pull loose—it's bonded to tough duck carcass.

Right for heavy service—Strong and flexible, light in weight and easier to handle than rough bore hose.

Call your Hewitt Rubber Distributor (see "Rubber Products", classified phone book) or write for descriptive literature.



STEP UP OFF-SHORE SERVICE

Hewitt-Robins Sea Loading—Barge Loading Hose

For Sea Loading: Monarch® Sea Loading Hose has smooth bore. No coil of wire projects inside the tube . . . turbulence is cut to a minimum . . . flow increased up to 50%.

For Barge Loading: Conservo® Barge Loading Hose recommended for light barge petroleum service . . . comparatively low pressures, no severe handling. Smooth bore for fast flow. Available with either built-in steel nipples or integral rubber flange with swiveling bronze backup ring.

Get complete facts about all types of Hewitt-Robins hose. Call your Hewitt Rubber Distributor (see "Rubber Products", classified phone book) or write for descriptive literature.

HEWITT-ROBINS HR INCORPORATED

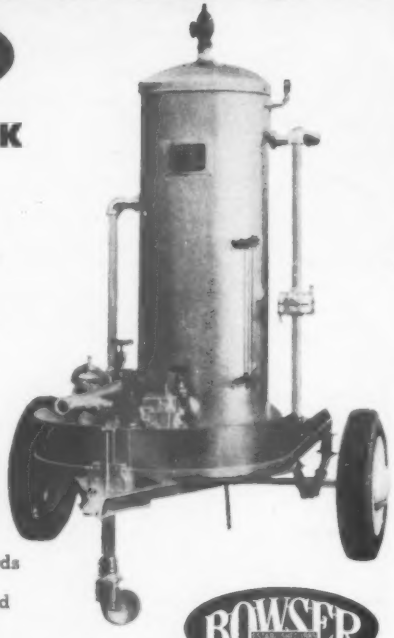
STAMFORD, CONNECTICUT

"Lie Detectors" for OIL WELLS

BOWSER

PORTACHEK

- Accurately Records Gross Production
- Provides Permanent Indisputable Records
- Furnishes True Proportional Sample
- Detects Sleepers or Wet Wells
- and by eliminating gage tanks, PORTACHEK
- Stops Losses from Evaporation
- Minimizes Fire Hazards
- Reduces Pumping and Transportation Costs



BOWSER

STATIONARY METERS AND SAMPLERS for OIL WELL PRODUCTION

Dependable operation is assured on flowing or pumping wells—either as mobile units or for permanent installations. Bowser meter engineers are always at your service for recommendations on Well-Check Systems for all types of wells.

Write for complete information.

BOWSER, INC., 1328 Creighton Ave., Fort Wayne 2, Indiana

XACTO • THE WORLD'S MOST WIDELY USED METER

the compressor also furnishes gas for gas lifting when required.

At the present time, there are three gas-injection wells, the major part of gas automatically feeding the well which has the lowest bottom-hole pressure. The original injection pressure was approximately 1,200 psi. and has increased to the present 3,000 psi.

The present method of operation is to inject gas and produce the surrounding oil wells until an excessive gas-oil ratio makes the production of oil prohibitive. When the ratios approach 8,000 cu. ft. per bbl., they are converted into injection wells. When a well is thus converted, it takes the major part of the gas until the pressure is built up equal to the other injection wells.

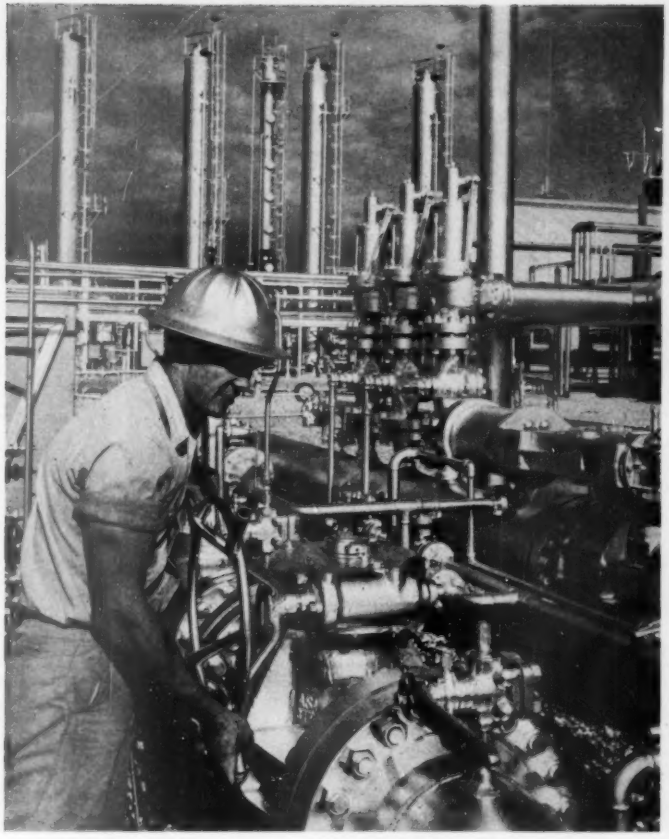
The two water-injection wells were originally completed slightly below the water-oil contact with 12 shots per foot. These wells were acidized and backflowed in order to clean them up to take salt water at a vacuum.

An excellent supply of 1.06 gravity salt water with a turbidity of less than 5 was found by recompleting an abandoned well at 5,400 ft. There is a little gas produced with this water and it is pumped directly from the well through a separator and from there gravities to an injection well.

The system is entirely closed with a back pressure of ½ psi. of gas maintained to exclude all oxygen. No filtering or other treating equipment has been necessary. The injection wells take water on a vacuum, but from time to time it has been necessary to increase well-head pressures to the neighborhood of 10 psi. A temporary pump has been set up for this purpose.

When this injection pressure exceeds 10 psi. the wells are equipped with gas lift and are backflowed after which they take the water on a vacuum again. Water produced with the oil is not being returned to the producing formation, but is being injected into another disposal well in a separate sand.

Throughout all of the experimentation and planning, the Railroad Commission has been very cooperative in this undertaking and has permitted the operator much leeway in order to determine the best method of operation. The results of this project, which may be considered a salvage operation, indicate that many more barrels of oil will be produced from this reservoir with the conservation of previously flared casing-head gas. No doubt there are many similar projects both in and out of Texas which might benefit from a similar treatment if cooperation could be obtained among the various parties concerned.



INPUT RATING on this new plant is 230,000,000 cu. ft. of gas daily.

Phillips' Bayou Gasoline Plant Recently Placed in Operation

This Gulf Coast installation, in Chocolate Bayou field, producing 200,000 gal. per day of liquid hydrocarbons

by A. J. Miller* and E. A. Harper*

LOCATED in Brazoria County, Texas, about 32 miles south of Houston, Phillips Petroleum Co.'s Bayou Gasoline Plant was recently placed in operation. This plant, a step in Phillips' Gulf Coastal expansion program, is initially processing approximately 230,000,000 cu. ft. of gas daily from Chocolate Bayou field and producing approximately 200,000 gal. per day of liquid hydrocarbons. The liquid products from this plant augment the short supply of petroleum products without the drilling of additional oil or gas wells.

Chocolate Bayou field, under careful development over the past 13 years, produces from the Frio sands at depths ranging from 8,700 to more than 10,000 ft. where pressures in the order of 5,000 to 7,000 psi. are encountered. In the present status of development, large volumes of reserves have been proven; yet the field has not been entirely defined.

Production from both distillate and oil wells is passed through two stages of separation on the respective leases, and the liquids resulting from this operation are measured on the leases as oil production. The gas from both stages of separation is metered individually on the leases and gathered into high and low-pressure field systems, operating at approximately 1,000 and 15 psig., respectively. A third field system, operating at approximately 500 psig., is employed to gather high-pressure gas that cannot meet the 1,000-psig. pressure. This intermediate system is justified by savings in horsepower that would be spent by bringing this gas into the 15-psig. system.

The low-pressure gas is compressed at the plant through three stages of compression to 500 psig., where it is commingled with gas from the intermediate gathering system and then the combined streams are compressed to 1,000 psig., commingled with the gas from the high-pressure gathering system, and processed through the plant absorbers for extraction of the condensable hydrocarbons. The residue gas from the absorbers is sold to pipe-line companies. Liquid products recovered at the plant are either sold by tank car or tank truck or are moved out by pipe line.

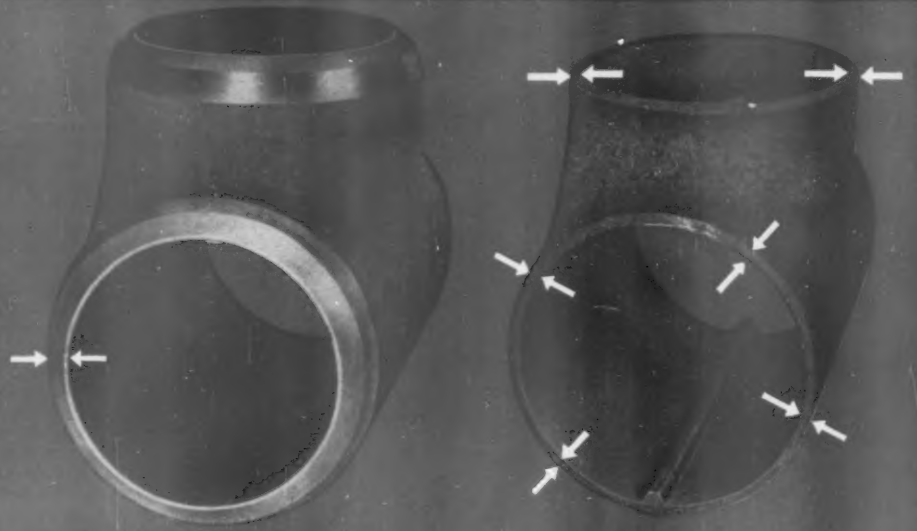
Plant Process Flow

Gas passing through the absorbers is contacted with lean oil from one of two identically sized distillation units designed for an oil circulation of 1,200,000 gal. per day each. Rich oil from the absorbers is flashed through two stages of venting, heated by heat exchange with lean oil, and then fed to a rich-oil demethanizer unit which removes essentially all of the methane and ethane from the rich oil. The kettle of the demethanizer is heated by another series of heat exchange with lean oil followed by a steam heater which controls the final kettle temperature. Vapors produced by the heat exchangers are removed in a vent tank and returned to the demethanizer to aid in stripping the ethane from the bottoms product.

Rich oil from the demethanizer is passed to a high-pressure still operating at 170 psig. where the oil is partially stripped. The overhead product is then passed through a dephlegmator vessel and cooling coils where the gasoline vapors are condensed and flow into the

*Design section, Natural Gasoline Dept., Phillips Petroleum Co.

EVIDENCE OF SUPERIORITY IN *Corrosive Service*



BEFORE *Midwest 4" extra heavy weight, carbon steel tee showing original wall thickness of tee at right before it was accidentally subjected to corrosive conditions.*

AFTER *When straight pipe in line had failed from corrosion, this Midwest tee was removed. Note amount and uniformity of wall thickness remaining.*

A valve leaked or somebody opened it by mistake . . . so the Midwest Tee shown above was subjected to dilute hydrofluoric acid in addition to its normal service in a 300° F. hydrocarbon line on an alkylation unit.

The highly corrosive acid caused failure of the straight pipe . . . so the entire line had to be replaced. When cut out of the line, the Midwest Tee was found to have a considerable (and uniform) wall thickness. There was no selective corrosion and the weld held up even better than the parent metal.

This was not special alloy made to resist corrosion, but regular Grade "A" carbon steel . . . the same as the new tee shown left above. We do not, of course, recommend carbon steel for corrosive conditions, but, in emergency, it gives good account of itself.

The exclusive Midwest manufacturing process produces fittings of superior metallurgical properties. The metal is worked in compression . . . it is not stretched or extruded, and distribution is uniform. After forming and welding, the fitting is stress-relieved. For further information, write us for a copy of Catalog 48.

MIDWEST PIPING & SUPPLY CO., INC.

Main Office: 1450 South Second Street, St. Louis 4, Mo.

Plants: St. Louis, Passaic, Los Angeles and Boston

Sales Offices: New York 7—50 Church St. • Chicago 3—79 West Monroe St. • Los Angeles 33—520 Anderson St. • Houston 2—1213 Capitol Ave. • Tulsa 3—224 Wright Bldg. • Boston 27—426 First St.

STOCKING DISTRIBUTORS IN PRINCIPAL CITIES

MIDWEST WELDING FITTINGS

IMPROVE DESIGN AND REDUCE COSTS

fractionator feed tank. The partially stripped oil from the high-pressure still is then stripped of the remaining gasoline constituents in a low-pressure still operating at 35 psig. The low-pressure-still overhead product is totally condensed in cooling coils and delivered to the make tank, from which it is blended with the gasoline from the high-pressure still to form the fractionator feed product.

Hot lean oil from the low-pressure still is passed first through the demethanizer kettle heat exchangers and then to the demethanizer feed heat exchangers. Some lean oil is bypassed to obtain the desired rich-oil temperature for feed to the demethanizer. The final lean-oil cooling is then accomplished by coils in an induced-draft cooling tower.

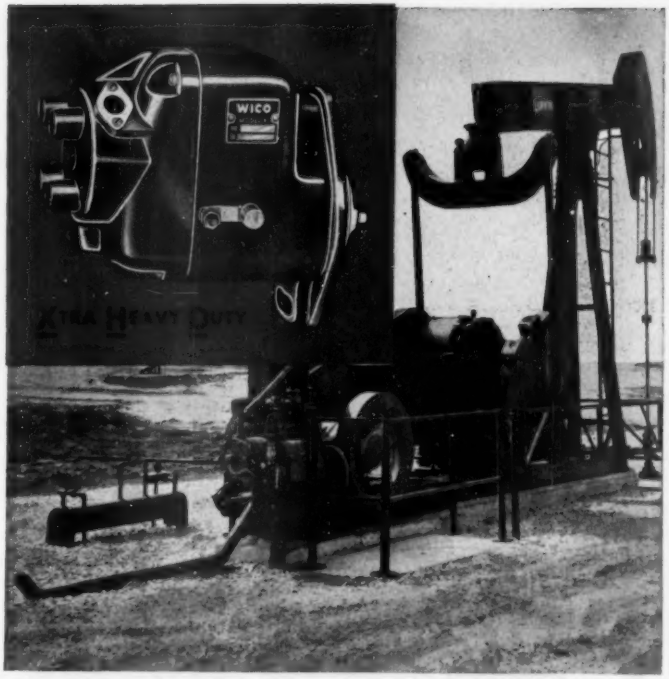
Plant fuel requirements are supplied from the rich-oil demethanizer residue. In order to balance the residue volume with the volume of fuel required, plant flash vapors are fed to the upper section of the rich-oil demethanizer in the quantity required to maintain the fuel pressure. Excess flash tank vapors are recycled through the compressors to the absorber inlet. These recycled vapors are taken from the first flash tank, operating at 500 psig., so that horsepower requirements are minimized. Thereby, in addition to providing a ready means for controlling the residue gas composition, the process system provides a balanced fuel supply from processed plant vapors at a minimum of over-all compression requirements.

Plant Utilities

Bayou plant is completely independent of outside sources of utilities since water, electrically, and steam for the plant, camp, and office uses are produced at the plant. Water is produced from one of two wells drilled to a total depth of about 650 ft. each. These wells are equipped with pumps to produce a capacity of 17,000 bbl. of water per day, but a larger volume of water can be produced by installing larger pumps.

Steam from the plant is produced by seven boilers having a rated continuous load capacity of 25,000 lb. per hour each at 400 psig. and 50° F. of superheat. These are marine-type boilers with builtin superheaters and motor-driven fans for induced-draft operation. Water makeup to the boilers is held to a minimum by condensing and returning to the system the steam used in the stills and condensate from heating equipment in the plant.

Makeup water required for the boilers is treated for hardness, alkalinity, and silica removal by means of a hot-



Dependable ignition pays off —on pumping and drilling jobs

Ignition failures can knock your engines cold. But you don't have to worry about ignition troubles when you've got a WICO XHD *heavy duty* magneto on the job.

This magneto always feeds a hot, lively spark, even under the toughest conditions. It can keep running for weeks . . . even months . . . without let-up. Sand, dust and dampness can't stop it. Shock and vibration bounce right off it without any effect. It is this performance that has made Wico the choice of leading manufacturers as original equipment on their engines.

The WICO XHD is extra rugged in every way. Its heavy duty coil is molded in solid plastic that takes long exposure to wet weather without arcing through. Large diameter tungsten breaker contacts are long wearing, easy to adjust. All bearings are factory lubricated . . . never need attention. The rotor is a sturdy one-piece unit with Alnico-6 magneto cast directly to the shaft. Weatherproof finish covers all exposed metal parts. Available for four or six cylinder engines, with either flange or base mounting.

See your equipment dealer for full details on the complete WICO line, or write us for list of WICO Authorized Service Stations nearest to you.

WICO Electric Co., West Springfield, Massachusetts

WICO

handle
ALL pulling jobs
swiftly...easily...safely
with
Snap-on*
INTERCHANGEABLE
PULLER TOOLS
With a minimum investment in pullers and adaptor units, you're set to handle every pulling job in the plant—swiftly and easily—with safety to the workman and the work. Snap-on puller sets offer an unusually wide range of interchangeability, giving substantial savings in initial cost. The Industrial Puller Set illustrated, CG-608, will handle all puller operations encountered in most shops—size capacity up to 14" diameter with power up to 20 tons.
Write for the Snap-on Industrial Catalog and general catalog of 4,000 hand and bench tools. A nearby Snap-on factory warehouse is ready to give you immediate service on all your tool requirements.
Snap-on Tools
THE CHOICE OF BETTER MECHANICS
SNAP-ON TOOLS CORPORATION
8098-F 28th AVENUE, KENOSHA, WISCONSIN
*Snap-on is the trademark of Snap-on Tools Corporation

process lime-gypsum water softener. The treated water, together with the returned condensate, is reduced to zero hardness by adding phosphate and deaerating in the second stage.

Three steam systems are utilized. These are a 400-lb. live-steam system, a 175-lb. exhaust-steam system, and a 50-lb. exhaust-steam system. All process turbine drives use 400-lb. steam and exhaust into one of the two exhaust-steam systems. Steam in these systems comprise the steam supply, after superheating for the high and low-pressure stills. To balance the steam systems further, fractionator reboilers are heated by the use of the steam supplied from the exhaust-steam systems. Certain standby drives in the plant are either steam or electric such that a change in the steam or electric demand may be rebalanced to produce a better control on the exhaust steam supply.

Electricity for the plant is produced by six 300-kw., 3-phase, 450-volt, turbogenerators. The steam turbine drives exhaust through condensers to 26-in. Hg vacuum. Cooling water for the turbogenerator system is furnished from a three-cell induced-draft cooling tower.

The main plant cooling tower serves all of the cooling requirements for the process equipment. This is done completely by means of atmospheric sections located in a two-cell induced-draft tower with a coil shed extension to house a total of thirty-four 6 ft. by 20 ft. coil sheds. Circulating water is furnished by three electric-driven deep-well-type pumps.

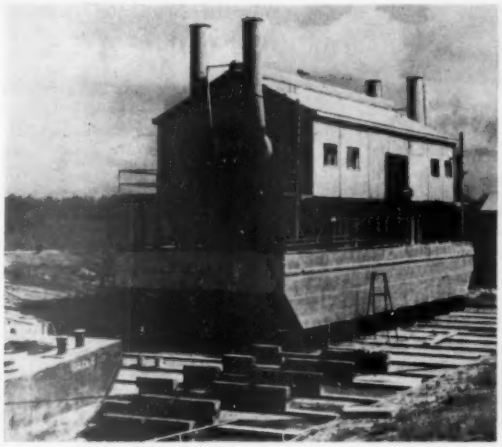
One of the cooling-tower water-circulating pumps is equipped with a fluid drive designed to utilize power available from the rich oil when it is reduced from absorber pressure to the first flash tank pressure. Heretofore, this power has not been utilized, but constitutes a considerable potential for harnessing.

Operating Personnel

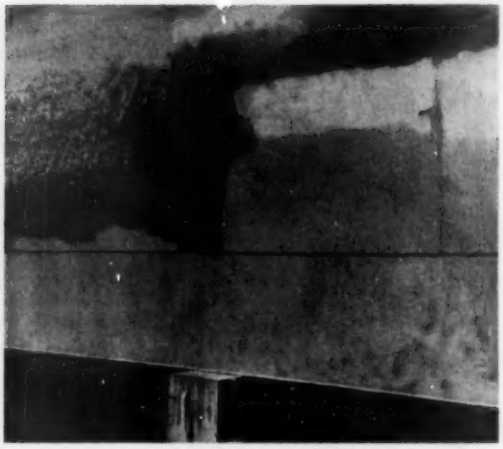
The plant is under the supervision of C. L. Leisure, plant superintendent. J. A. McMillan is chief operator, and J. W. Deaton maintenance superintendent.

There are 42 employes at the plant. All of the routine maintenance work, including the boiler maintenance, engine maintenance, electrical work, and continuous maintenance painting is performed by plant employes.

Brown & Root, Inc., constructed the plant in accordance with the process design and equipment specifications prepared by the natural gasoline department of Phillips Petroleum Co.



Boiler barge after being coated on sides and bottom only. Also a portion of a cargo barge in the left foreground. Note that this is not a typical drydock, but instead is a submerged basin.



A portion of boiler barge side during sandblasting operations. Notice pitting on clean steel and marine growth on old coated surface. Dry sandblasting was used on this job.

Vinyl Coatings Protect Marine Installations From the Ravages of Corrosion

Drilling, cargo, and boiler barges protected for service in Gulf Coast waters

by H. E. Waldrip*

THE discovery of oil in our coastal bays and offshore in the Gulf of Mexico has created a very serious type of corrosion problem. Conventional marine paints have failed to give adequate protection for permanent or semi-permanent installations. During World War II vinyl coatings were developed for use on naval vessels and became available to industry very shortly thereafter. These vinyls have been tested by many companies and at the present time, when properly applied, offer the best obtainable marine coating protection.

This report discusses the many variables in formulation, hence the need for evaluation, proper surface preparation, and above all constant supervision and inspection during application on marine equipment used in the search for and production of oil.

What Are Vinyls?

"Vinylite" is the trade name of a broad class of vinyl acetate, vinyl chloride-acetate, and vinyl butyral resins. To the chemist the vinyl chloride-acetate is a copolymerization product of vinyl chloride, a gas, and vinyl acetate, a low-boiling-point liquid.[1] The properties can be altered or tailored by modification, varying the ratio of the vinyl chloride and vinyl acetate, and by chemical rearrangement and replacement. Actually it is a product of extensive chemical research to develop synthetically a resin with superior properties to any found in nature. To the layman, vinyl or vinylite is a plastic shower curtain, rain coat, unbrella, apron, beach ball, garment bag, upholstery fabric, phonograph record, electric wire covering, improved electric insulating tape, garden hose, or any of the hundreds of other items of everyday use.

Vinyl coatings are made from the same resins used in the above-named items with which everyone is so familiar. They are simply vinyl plastic in liquid state, which form protective coatings simply by solvent evaporation. They differ in this respect from ordinary coatings or paints, which depend upon oxidation and/or polymerization to produce their protective film. During World War II the makers of vinylite resins, in conjunction with the U. S. Navy, carried on extensive tests to perfect underwater and topside protective coatings capable of withstanding the corrosive action to which the fleet was subjected. Since the war vinyl coatings have been used successfully on the West Coast tuna boats.[1] They have also given outstanding performance on ocean-going freighters, barges, tugs, and other vessels.

Composition of Vinyl Coatings

The question might be asked: Why discuss the composition or manufacture of vinyl coatings when the consumer has no control over them? We are vitally interested in the composition since it affects the application characteristics, toughness, elasticity, durability, and other properties of the coating.

The choice of the vinyl resin itself allows the manufacturer considerable leeway, since there are four general

*Gulf Oil Corp. Gulf production division, Houston Chemical Laboratory.

Install STABBING BOARDS*

...for the safety of your crew!

- *Wide Working Range for Mixed Pipe*
- *Operates by Compressed Air or Electricity*
- *Board Folds Back Out of Way*
- *Easy to Operate*
- *Easy to Install*
- *Reasonable in Cost*

Notice how close the Derrickman can be to his work and in complete safety.

Cut down on time lost from accidents, increase your savings on drilling time with the SAFETY ADJUSTABLE STABBING BOARD*. Proof that this STABBING BOARD is a valuable asset around any rig is the fact that major oil companies as well as independent drilling contractors are now using it.

This board has a very wide working range for setting casing. In addition to its use as a stabbing board, there are many other ways to use this board as a time saver, such as: Greasing the Traveling Block, Repairing Swivel; Attaching and removing Mud Hose; Hooking up for Drill Stem Tests; and Painting Traveling Block while in operation. Write for a demonstration of the SAFETY ADJUSTABLE STABBING BOARD*—today and you'll see just what it will do for you.

*PATENTED

FOR COMPLETE INFORMATION AND PRICES *Write Today!*

MERRITT Tool Company

MERRITT TOOL CO. M OIL TOOLS AND SERVICE

BOX 1209 — — KILGORE, TEXAS

"There are four general types of vinyl resins . . ."

types of vinyl resins used in protective coatings.

These are:

1. Copolymers of vinyl chloride and vinyl acetate.
2. Tripolymer of vinyl chloride, vinyl acetate, and maleic anhydride.
3. Vinyl chloride-vinyl acetate copolymer, which is modified by replacing some of the acetate groups in the resin molecule with hydroxyl groups.
4. Vinyl butyral resin.[1]

By altering the ratios of any of these types it can easily be seen that there are a great many resins to choose from in formulating a coating. Actually, in August 1946 there were 19 different vinyl resins used in organic coatings.[2] There are very probably a great many more in use today.

Theoretically, most common paint pigments can be used in formulating vinyl coatings. These coatings, however, are primarily used where ordinary paints are unsatisfactory. Therefore, the environment is usually more severe. Common sense tells us that pigments that will dissolve in, or react with the environment cannot or should not be used. Undercoats often contain inhibitive pigments to give corrosion protection. Pigment is used to increase film thickness, to provide color (thus insuring complete coverage with each application by alternating colors), to provide decorative effects, and to help prevent degradation by ultraviolet light.

Tests show that iron and zinc-based pigments do not withstand severe weathering.[1] These two types of pigment are not compatible with vinyl coatings.

Plasticizers are used to impart flexibility and some degree of softness to the finished film. The chemistry of the various types will not be discussed, but any plasticizer should have certain definite properties. It should be permanent, it should not evaporate, oxidize, or otherwise change in its original properties. It should not react with or be dissolved by the environment.

The choice of solvent is vastly more important than one would ordinarily think. An ideal solvent balance is one that has the desirable solvent properties and an evaporation rate slow enough to allow the coating to actually wet the surface on which it is sprayed without "cobwebbing" or drying out. However, evaporation rate should be rapid enough so that all of the solvent has escaped from the coating film before the succeeding coat is applied. The solvent should evaporate in such a manner as to produce a minimum of pin holes

When the going is *ROUGH*

use ALTEN PUMPING UNITS!

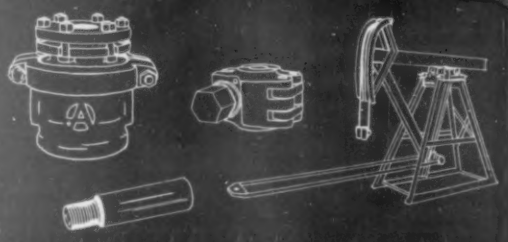
ALTEN

The value of a pumping unit depends solely on performance — because Alten units are thoroughly pre-tested, you can be sure all will perform to their full rated capacity. Alten constant quality control gives you a sure-fire way to eliminate all guesswork, get top pumping performance, and cut operating costs.

YOU GET

Thorough Factory Pre-Testing
Longer Strokes
Higher Gear Reducer Ratings
Flame Hardened Helical Gears

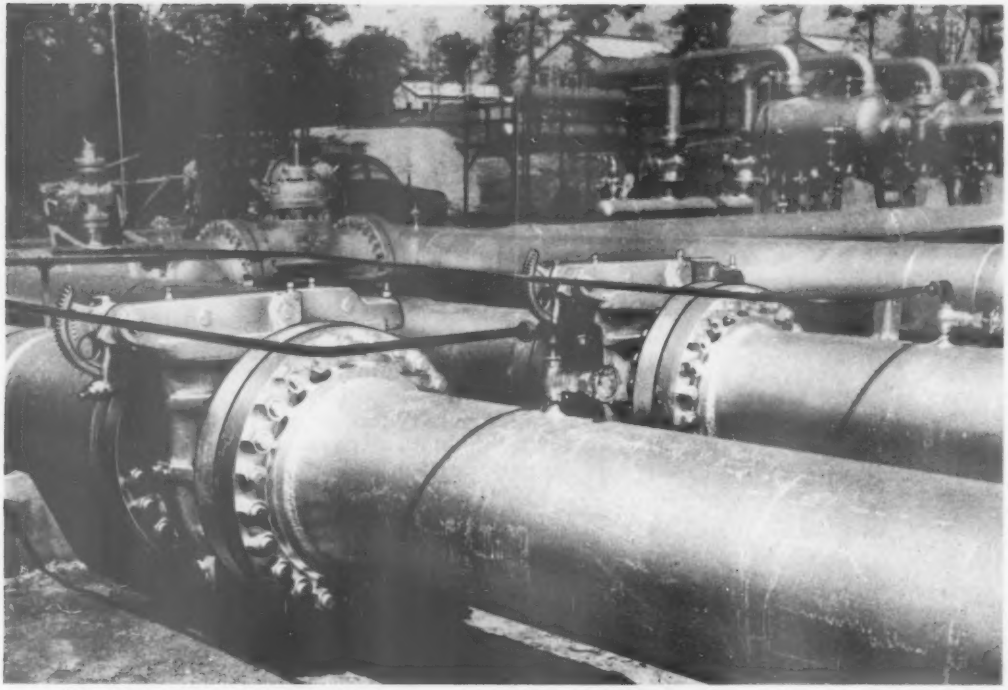
Buy Alten Oil Field Pumping Equipment at Your Local Supply Store.



Advantages of Helical Gears

- Hobbing process gives more accuracy than shapers used to produce herringbone gears.
- No unflexing V centers which cause uneven wear.
- 10% to 20% lower impact or backlash loads.
- Flame hardened gear teeth for hardest surfaces.

— ALTEN —
Foundry & Machine Works, Inc.
LANCASTER, OHIO

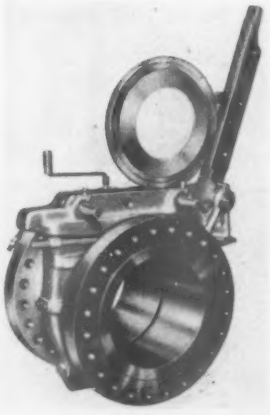


Two 20" Type DPL Commercial Orifice Fittings on a measurement manifold of United Gas Pipe Line Company at McComb, Mississippi. The many other Commercial Orifice Fittings at McComb range upward from 10" in size.

COMMERCIAL ORIFICE FITTINGS

for high pressure gas and oil transmission lines

The pin-locked cover of this Commercial Orifice Fitting is quickly unlocked or locked by a few turns of the pinions, making inspection and change of the orifice disc faster than is possible with bolted cover types. On sizes 18" and larger the cover is raised by a gear; on smaller sizes an extension bar is used. A simple "O" ring packing securely seals the cover and is inexpensive and easy to replace. Particularly designed for use on high pressure oil and gas transmission lines, Commercial Type DPL Orifice Fittings are available in ratings from 600 lb. ASA to 2500 lb. ASA, in sizes from 2" to 20". Larger sizes are available on order.



Refer to your Composite and Refinery Catalogs, and ask our nearest Distributor for complete information.

COMMERCIAL IRON WORKS

2424 PORTER ST., LOS ANGELES 21, CALIFORNIA

DISTRIBUTORS • ARKANSAS, KANSAS, OKLAHOMA: The Candit Co., 1011 South Main St., Tulsa 3, Oklahoma. CALIFORNIA: Gordon Z. Greene Co., 2335 East Eighth St., Los Angeles 21, California. LOUISIANA: Coastal Engineering Corp., P. O. Box 68, Harvey, Louisiana (Warehouse Stock and Service Dept.). TEXAS: Maintenance Engineering Corp., P. O. Box 2637, Houston, Texas (Warehouse Stock and Service Dept.). CANADA: Peacock Brothers Ltd., P. O. Box 6070, Montreal, Quebec, Canada. Peacock Brothers Ltd., 215 10th Avenue West, Calgary, Alberta, Canada. Peacock Brothers Ltd., 114 Bond Street, Toronto 2, Ontario, Canada. MEXICO: Schultz y Cia, S.A., Calle De Sullivan 119, Mexico, D.F.

EXPORT REPRESENTATIVE: Victor A. Indig, 427 Bryant St., San Francisco 7, California.

or "holidays." The solvent balance should be such that satisfactory spray application can be obtained in the laboratory and in the field, both on interior and exterior surfaces. The author once tested a vinyl system that ranked with the best in its durability, but because of difficulty in application it could not be approved. This difficulty resulted from the use of solvents that were too volatile.

One of the early vinyl systems required 1 day's drying time between coating applications. Using this procedure, the system gave very good field performance. The formula was later revised to a rapid-drying type requiring only 1 hour between applications and the system gave very poor results. This is an indication that the manufacturer did not understand the importance of proper solvent balance in formulating the vinyl coating.

The foregoing discussion on composition clearly shows the multiplicity of variables at the manufacturer's disposal in compounding a vinyl coating. It is, therefore, easy to understand why no two vinyl systems, as produced by different companies, are the same. Because of the differences in formulation, vast differences are found in application characteristics and lasting properties in vinyl coatings. Therefore, it is necessary to screen test vinyl systems in the laboratory before recommending their use on marine equipment.[3] In his article,[3] Barrett states that it has been the practice of some companies to accept a reliable or well-known manufacturer's recommendations, or to select from advertising literature, a product for which the manufacturer makes the most outstanding claims. The choice of a marine coating system by either of these methods is almost sure to prove unsound.

Coating Steel Surfaces

One of the major functions of any coating system is to provide a barrier between the metal to be protected and the corrosive environment.[4] Vinyl coatings have much lower moisture-vapor transmission rates than oleoresinous paints. In order to obtain the desired protection from vinyl coatings, most manufacturers and consumers who have extensively tested vinyls agree that a minimum of 4.5 to 5 mils film thickness is necessary.[5,6]

In some cases very good results have been obtained with less than the recommended film thickness, but in all likelihood even better results would have been realized had one or two ad-

SARAN LINED steel pipe

Cut "downtime" to a minimum! Saran lined steel pipe can be cut and threaded in the field as easily and quickly as ordinary steel pipe—involving NO costly delays with special tools or handling. And, once installed, saran lined steel pipe means dependable long term operation. In addition to excellent corrosion resistance, this remarkable pipe offers you the plus values of rigidity and pressure strength.

These advantages are of prime importance to you in the reduction of shut-down time and equipment replacement. INVESTIGATE saran lined steel pipe today! Mail this coupon for full information. *Saran lined steel pipe is manufactured by The Dow Chemical Company.*

Distributed by

Saran Lined Pipe Company

2415 BURDETTE AVE. • FERNDALE, MICHIGAN
With Offices in: New York • Boston • Philadelphia Pittsburgh • Chicago • Tulsa • Portland • Indianapolis San Francisco • Houston • Denver • Seattle • Los Angeles • Cleveland • Charleston, S. C. • Toronto

send today!

Please send me your catalogue containing detailed information on Saran Lined Pipe, Valves and Fittings.

NAME_____

TITLE_____

COMPANY_____

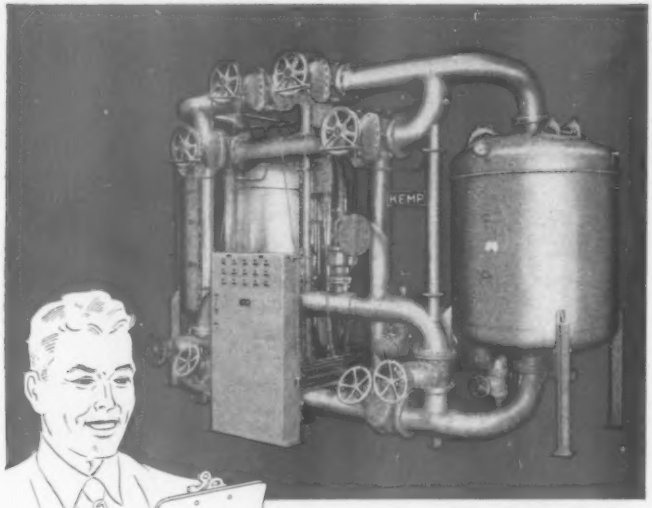
ADDRESS_____

CITY_____

STATE_____

SARAN LINED PIPE
DOW
product

There's a KEMP DRYER for every Moisture Problem



Dry air, gases, liquids to sub-zero dew points . . . at minimum cost

Quality, diversity, flexibility, economy . . . four good reasons why Kemp Dynamic Dryers offer you the *best* solution for *any* moisture problem. Kemp superiority of design and engineering know-how is your assurance of *dependable, low-cost* performance whether you dry air, gases or liquids. Many Kemp users report drying to sub-zero dew points for as little as ¼¢ per mcf—including all charges for labor, capital investment and materials. In addition, Kemp guarantees operation of every unit to meet your specifications.

3 BASIC DESIGNS AVAILABLE*

ORIAD—Dries air used to actuate tools, valves, instruments, etc., where drying requirements are moderate.

RADIATION COOLED—For small or medium flow rates. Offer low operating cost with maximum efficiency.

CONVECTION COOLED—Provide continuous drying capacity of air and gases at minimum cost.

*All of above in complete range of sizes with manual, semi-automatic or fully automatic operation.

Kemp Engineering Versatile

Gas, electric or steam regeneration is standard equipment with every Kemp Dynamic Dryer . . . with or without cooling units. Also, depending on your needs, you have a choice of manual, semi-automatic or fully automatic operation. In every instance, Kemp will specify the proper dessiccant suitable for your operation. Chances are there is a standard Kemp design that is ideal for your plant and saves you money too. It costs you nothing to investigate.

KEMP OF BALTIMORE

DYNAMIC DRYERS

For technical information and facts on how Kemp Dryers can solve your moisture problems, write for Bulletin D-27 to:

THE C. M. KEMP MFG. CO.
405 E. Oliver St., Baltimore 2, Md.

"Dry sandblasting more satisfactory than wet . . ."

ditional coats been used. The expense of sandblasting and preparing a surface for the application of vinyl coating is the same regardless of the number of coats used. Therefore, the cost of one or two additional coats, percentagewise, does not increase the cost of the system proportionately to the number of coats applied.

Surface preparation . . . Proper surface preparation is necessary prior to the application of vinyl materials. Steel surfaces must be sandblasted to bright metal.[7,9,10] Dry sandblasting is much more satisfactory than wet sandblasting, and this method should be required in the specifications for coating application. In a particular instance, where wet sandblasting was used in a corrosive atmosphere, a thin film of rust formed before the surface could be coated.[5] This occurred even though the water used for blasting and rinsing contained a rust inhibitor of such concentration that it caused irritation of the workmen's skin.

Sandblasted surfaces should be coated as soon as possible with a vinyl-type wash primer, and all sanded areas must be coated before the end of the work shift. Some coating specifications require that all sandblasting be done by the day shift and on a dry day.[5]

Most wash primers are formulated from a vinyl butyral resin. At least one manufacturer uses a vinyl chloride-vinyl acetate resin in the primer as well as in the other coats making up the complete system. These special primers, wash or otherwise, contain a minimum amount of inhibitive pigment and are usually mixed with phosphoric acid just before use. Thorough mixing, preferably with a high-speed agitator, is necessary in order to obtain complete dispersion of the phosphoric acid.

At the present time there is a trend toward changing the terminology of these special vinyl "wash" primers. It is suggested that they be called "vinyl metal conditioners."[10] Such a designation would seem to be advisable since these special primers are in reality surface conditioners. In addition to this function, they also serve as excellent inhibitors for the freshly sandblasted steel and aid in increasing adhesion both to the metal and to subsequent coats.

Many individuals tend to think of a vinyl surface conditioner, when identified as a primer, as one coat in the complete vinyl system. This is a fallacy, because the surface conditioner is applied so thinly that the film obtained

HERE'S WHERE "PERFECT CIRCLE" CEMENTING PAYS OFF!

At bottom, where you can make or break a good cement job, is where the Larkin Geyser Shoe pays off! The slurry speeds from the shoe in a conical sheet to remove bridges and cavings and to cut mud cake from the hole wall. The Geyser Shoe distributes cement evenly at the shoe point, providing the best chance for an even flow of cement up around the casing and reduces the possibility of channeling.

Larkin Geyser Shoes are designed and built to contribute all that a float shoe can to a successful cement job. And the tens of thousands of wells which have been successfully cemented with Geyser Shoes prove it!

LARKIN PACKER COMPANY, INC.
ST. LOUIS, MO.

The Larkin Geyser Shoe has a bakelite back pressure valve stronger than you'll ever need and is designed to provide free passage of additives. The shoe may be readily drilled out despite its superior strength.

Specify **LARKIN**

...Through Your Supply Store

is only a fraction of that formed by the application of a regular coat.

These primers have a low viscosity that permits penetration into corrosion pits or other rough surfaces.[1] When applying such inhibitive primers a thin coat of from 0.2 to 0.3 mils is desirable.

Later coats . . . After a minimum of 30 minutes' drying time the surface is ready for the second coat. This second coat is usually pigmented with a basic type inhibitive material. Quite often it is primarily a lead oxide and/or lead chromate material. This second coat is sometimes referred to as an intermediate or barrier coat. Because of its leafing tendency, metallic aluminum makes an excellent barrier and has been recommended by some manufacturers as a second coat.

While perfectly satisfactory as a third or later coat, the use of aluminum-pigmented vinyls is dangerous when used as a second coat directly over the primer. In our testing of vinyls, and in at least two other companies' tests, severe pitting occurred on scored panels where an aluminum system was used as a second coat. Apparently the aluminum acted as a cathodic area and the bare metal acted as an anodic surface. All of these failures occurred on the same maker's product, and they did not occur when another barrier coat separated the primer from the aluminum pigmented coat. This pitting did not occur with another system which uses only aluminum-pigmented vinyls as the entire system over the primer.

There should be sufficient difference in color in subsequent coats to insure complete and uniform coverage with each application. It is very important that each coat furnish the desired film thickness so that the completed system will have the necessary 4.5-5 mils thickness at all points.

Laboratory Testing

It has been found necessary to screen several different products by means of accelerated laboratory tests in order to select the most efficient vinyl system for use on barges and other marine installations.[3] Since cargo barges operate in both fresh and salt waters, two such accelerated tests are made. One is the standard salt fog test using a 20 per cent salt solution as the fogging material, operated in a test cabinet at a temperature of 100° F. The second test is a circulating aerated fresh water bath maintained at 120° F. The test panels are placed in this bath so that the upper half is exposed to saturated air. Of the two tests, the fresh water bath is more severe, resulting in earlier failures than obtained with duplicate panels in the salt fog cabinet. Some vinyl systems will give better results in one test than in the other. Therefore, it is better to choose a coating system with good lasting properties in both tests, rather than one which is excellent under one condition but poor in the other.

The manufacturer's recommendations for thinning and mixing are followed in preparing a vinyl for test. After the material is thinned to a consistency suitable for spraying, the viscosity is determined with a No. 4 Ford viscosity cup. A De Vilbiss suction-type touchup gun has been found to be very satisfactory for applying vinyl coatings in the laboratory.

To insure that the panel remains in a perfectly vertical position during coating application, a kitchen-knife bar magnet fastened to a laboratory ring stand is used. The primer is applied to the fronts of duplicate test panels which are then transferred to a drying

TABLE 1—SALT-FOG-CABINET TEST

Vinyl product	System (See explanation)	First evidence of failure, hrs.	Type of failure	Total hours in test	Appearance at end of test
A	W.P., interm., alum., 2 top coats.	864	Tiny blisters.	7,000	Tiny blisters; good bonding; slight creep.
A	W.P., 2 alum. coats, 2 top coats.	864	Slightly rough.	7,000	Tiny blisters; good bonding; deep pitting at scoring.
B	W.P., 2 coats alum. vinyl.	2,170	Covered with small blisters.	5,000	1 small rust spot; rusty streaks along edges; slight creep.
C	W.P., interm. coat; 3 top coats.	7,000	Few small blisters.	7,000	Blistered at scoring on back; bond good elsewhere; slight creep.
C	Copolymer primer; interm. coat; 3 top.	7,000	Few blisters on front; back blistered near score.	7,000	Same. Bond excellent except under blisters; slight creep.
C	Special primer; interm. coat; 3 top coats.	864	Slightly rough.	7,000	Few small blisters on front near edge and on back near scoring; good except under blisters; slight creep.
D*	W.P., 2 interm. coats; 2 top coats.	5,500	Small blisters at bottom.	7,000	Same. Bond excellent; slight creep.
E	W.P., 1 interm. coat; 3 top coats.	1,500	Small blisters.	7,000	Large blister at hanger hole; small blisters at edge; bond excellent; slight creep.

Explanation of systems: W.P.—Wash primer of vinyl butyral resin, special pigment and phosphoric acid. Interm.—Intermediate coat—anticorrosive coating. Alum.—Aluminum; pigmented with aluminum. Copolymer primer—Contains vinyl chloride-acetate resin, special pigment and phosphoric acid. Special primer—Contains modified vinyl resin, special pigment and phosphoric acid.

*Unsuitable for field use because of poor application properties; cobwebs badly when sprayed.

TABLE 2—FRESH-WATER-BATH TEST

Vinyl product	System*	First evidence of failure, hrs.	Type of failure	Total hours in test	Appearance at end of test	Creep
A	Wash primer; interm. coat; alum. coat; 2 top coats.	240	Covered with tiny blisters.	240	Same	None
A	Wash primer; 2 alum. coats; 2 top coats.	864	Surface rough.	6,000	Several large blisters at and below water line.	1/16 in.
B	Wash primer; 2 coats alum. vinyl.	2,170	Tiny blisters at edges.	4,056	Covered with tiny blisters below water line.	1/16 in.
C	Wash primer; interm. coat; 3 top coats.	1,025	Slight roughness caused by tiny blisters.	6,000	Covered with tiny to small blisters below water.	1/16 in.
C	Copolymer primer; interm. coat; 3 top coats.	1,025	Same as above.	6,000	Same as above.	1/16 in.
C	Special primer; interm. coat; 3 top coats.	864	1 small blister on back.	7,000	Very small blisters below water line.	Slight

*See explanation in Table 1. The order of magnitude used in describing the size of blisters in Tables 1 and 2 is tiny, very small, and small. All are less than pinhead in size.

TABLE 3—FIELD INSPECTION OF COATED BARGES

Barge No.	Type of barge	Coating system	Applicator	Date applied	Coating life and type failure
1	Drill	E	U	Feb. 1949	Peeling on 1 side at water line after 16 months. Some rusting below water line after 22 months.
2	Drill	E	U	July 1949	Few spots showing evidence of corrosion below water after 18 months.
3	Drill	A	U	Dec. 1949	Peeling along water line after 12 months; starting to rust on sides above water line and on deck after 12 months.
4	Drill	A	U	Aug. 1950	A few 1 to 2-in. areas rusting below water line after 12 months.
5	Boiler	A	U	Dec. 1949	Large areas rusting below water after 6 months. Insufficient material used on this application.
6	Boiler	A	U	May 1950	Appears to be in good condition after 19 months except for abrasion.
7	Cargo	A-1	R	Sept. 1949	Peeling and rusting below water after 15 months; practically no coating left on deck after 27 months.
8	Cargo	A-1	R	Sept. 1949	Deck failing after 15 months; about 80 per cent of coating gone from deck after 27 months; peeling in spots on sides and ends after 27 months.
9	Cargo	C	R	May 1949	10 to 15 per cent of deck rusty after 27 months; rusting at abraded areas on sides after 27 months; condition about the same after 33 months.
10	Cargo	C	R	May 1949	About 50 per cent of coating gone from deck after 19 months; about 95 per cent gone from deck after 31 months. Hull sides in good condition after 31 months.
11	Cargo	C	R	May 1949	OK after 19 months; 90 per cent of coating off deck after 25 months; 5 to 10 per cent of coating abraded and rusty on sides after 31 months.
12	Cargo	C-1	U	May 1950	Necessitated re-drydocking after 6 months because of corrosion on hull where barge had rested on blocks. These areas had not been prepared and recoated. Rest of barge OK.
13	Cargo	C	R	June 1949	10 per cent of coating off deck after 18 months; 50 per cent gone on deck and sides after 25 months. Rusting and pitting where bare after 31 months.
14	Oil storage	C-1	S	Mar. 1951	Recently coated; condition OK after 9 months.
15	Cargo	C	R	May 1949	25 to 30 per cent of coating gone from deck after 26 months; sides in good condition except for abrasions after 32 months.
16	Water storage	C	R	May 1949	10 to 15 per cent of coating gone from deck after 26 months; coating on hull sides OK except along guard rail after 26 months.
17	Cargo	C-1	T	June 1950	After 18 months about 10 per cent of coating gone from decks; sides OK except for abrasions after 18 months.
18	Cargo	C-1	T	April 1950	About 5 per cent of coating gone on deck after 20 months and about 10 per cent abraded on sides after 20 months.
19	Cargo	C-1	T	May 1950	Approx. 5-10 per cent of coating abraded on deck after 13 months; after 19 months coating on sides good except for abrasions; 10-15 per cent of coating gone and rusty on deck after 19 months.
20	Cargo	C-1	T	April 1950	5 per cent of coating off deck after 15 months; after 21 months deck condition same and about 10 per cent of coating abraded on sides.
21	Radio	C-1	U	Oct. 1950	Condition good after 14 months.
22	Cargo	C	T	May 1950	Some rusting along guard rail weld after 14 months.
23	Cargo	C	S	July 1950	Some rust developed at high water mark on 1 side of hull after 15 months; condition same after 25 months except for added abrasion.

System A—Vinyl wash primer, intermediate vinyl, aluminum vinyl and 2 vinyl top coats. System A-1—Vinyl wash primer, aluminum, intermediate vinyl, and 1 vinyl top coat. System C—Copolymer vinyl primer with 1 coat intermediate vinyl and 1 top coat vinyl. System C-1—Copolymer vinyl primer, intermediate vinyl and 2 vinyl top coats. System E—Vinyl wash primer, 3 vinyl coats, and 1 aluminum vinyl top coat.

TABLE 4—FIELD DATA ON THREE BARGES COATED WITH MARINE PAINT

Barge No.	Type barge	System	Applicator	Date applied	Time and type of failure
24	Water	D	R	Aug. 1949	15 per cent of coating gone on deck after 23 months' service. Sides could not be examined because the vessel was loaded with water.
25	Cargo	D	R	Aug. 1949	Blistering on sides after 10 months; 10 per cent of deck peeling and rusting after 17 months.
26	Cargo	D	R	Aug. 1949	After 17 months' service coating peeled in a 1-ft. band at hull water line. 20 per cent of coating gone on sides, considerable heavy rusty scale after 28 months. Deck was never inspected because of cargo.

System D—Sandblasted, then vinyl wash primer, regular marine primer, and two top coats of marine paint.

rack and suspended by S-hooks. When the fronts of the panels are dry they are returned to the magnet and coated on the reverse side. This procedure is followed for each succeeding coat making up the recommended system. After the final coat is dry, the film thickness is measured by means of a General Electric film-thickness gage. A large X is scored through the coating to bare metal on the panel back. The panel edges as well as the area surrounding the center hole are double dipped in molten ceresin wax to prevent edge attack.

Now that the coatings have been carefully applied over specially prepared metal surfaces, they are ready for the accelerated tests which will determine whether they are worthy of field use. Special hooks are made from vinyl-coated electric wire with the ends protected with ceresin wax. Using these hooks, one set of duplicate panels is suspended in the salt fog cabinet. The other set is inserted in a slotted, redwood, false bottom which is placed in a fresh-water bath. The specimens are examined at regular intervals and the first evidence of failure noted. They remain in the test until judged failures, or until a maximum of 7,000 hours is reached.

The condition of each panel is recorded and the coating tested for bonding characteristics by means of a simple qualitative test. A rectangular area measuring 1 by 4 in. is scored to bare metal and a strip of 1-in. Scotch tape pressed firmly over the scored section. When the tape is removed the coating will be peeled off with it if the bond is poor. The panels are examined at the X scoring for evidence of corrosion creep or pitting.

Those coating systems which possessed proper application characteristics, and which tolerated the accelerated tests to 7,000 hours, were then judged suitable for field testing. In some cases, coatings which did not remain in the test to the maximum 7,000 hours, but which gave physical evidence of good coating properties at the time of re-

The Klemp Metal Grating Corporation has been serving the needs of the Oil Companies for almost half a Century. During this time Klemp has produced and patented several specialized gratings such as Hexteel and Floorsteel for ganister linings in the Refining Division of the Oil Industry.

Klemp Welded Steel and Diamond Riveted Grating are consistently specified for stair treads, walkways, landings, tower stairs, catwalks, stairways and many other applications to insure —

- *Fireproof Non-Slip Footing for Men and Traffic.*
- *Efficiency with Safety*
- *Protection Plus Comfort Through Complete Ventilation.*

For 45 years the Klemp Metal Grating Corporation's engineers have specialized in the fabrication of gratings and open steel meshes only. This specialized experience is at your service. Factories are centrally located in Chicago and Houston.

We solicit the opportunity to solve your most difficult flooring problems. Send in your blue prints for quotations today.

All types of Klemp Open Steel Gratings are available for immediate shipment.

KLEMP
METAL GRATING CORPORATION
General Offices—6638 So. Melvina Avenue · Chicago 38, Illinois
Telephones—PArtsmouth 7-6760 and Summit 1608-1609

VINYL COATINGS—A discussion of test panels . . .

moval, were also included in the group for field tests.

In order to point out the variations in vinyl materials subjected to laboratory tests, data obtained on several vinyl systems are given in Tables 1 and 2. Several of these materials had been subjected to earlier laboratory tests, but since their suitability for marine service had not been determined it was deemed advisable to include them. In the earlier tests Product A was furnished on a test panel prepared by the manufacturer, and is is believed the coating was applied by dipping because of the greater film thickness found in the first test. The same system applied by spraying did not produce the same results in the second test series. This is an example of the necessity of preparing panels in the laboratory rather than testing those submitted by the manufacturer. In the case of Product B, only two finish coats of aluminum were applied, as recommended by the manufacturer.

It will be noted that in most instances, failure occurred sooner in the 120° F. fresh-water test than in the salt-fog cabinet. The second listing of Product A, Table 1, shows the deep pitting which occurred at the scored section of the panel when aluminum pigmented coats were applied directly over the primer.

As a result of these laboratory tests, products A, C, and E have been applied to marine equipment and periodic inspections are being made to follow the performance of these coatings in actual field use.

Coating Specifications

After laboratory tests have been completed and the vinyl system selected for marine service, the next step is the preparation of specifications in such a manner that there can be no misunderstanding on the part of the applicator. In the case of barges and other marine equipment, coating work is usually performed by shipyards, and in dealings with shipyards nothing can be taken for granted. Shipyard operators do not seem to understand the difference between painting a commercial vessel which regularly goes into drydock, and a barge which is used continuously for several years between drydockings.

Specifications which require that the entire exterior area of the hull be sandblasted and coated with a certain system are not sufficiently specific. It is necessary to specify that the hull support blocks be shifted and the areas

I *know*.. I use Totco

You'll see men who *know* choose the *Totco Recorder* time after time. In oil fields all over the world Totco has earned a reputation for accurate, reliable readings. Be sure *you* know... use Totco.

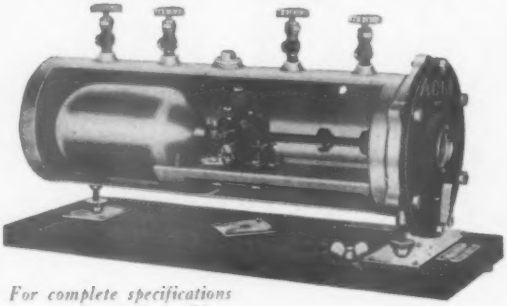
TOTCO *Recorder*

Technical Oil Tool Corporation
1057 N. La Brea Ave., Los Angeles 38, Calif.

EXCLUSIVE DISTRIBUTORS:

California—The Republic Supply Co. of California
Domestic—The Continental Supply Company
Canada—Oil Well Supply Division
United States Steel Company
Export—Lucey Export Corporation, New York City

SPECIFIC GRAVITY TESTER FOR GAS



For complete specifications write for Bulletin 50.

8360-8365

THE specific gravity of gas as found in various conditions in the field or laboratory may be determined quickly and accurately. The Refinery Supply Ac-Me Gravity Balance for wet or dry natural and artificial gases meets the standard specifications as recommended by the National Bureau of Standards and adopted tentatively by the Natural Gasoline Association.

Complete Line of Scientific Laboratory Equipment

Also Complete line of
CENTRAL SCIENTIFIC SPECIALTIES

CENTRAL SCIENTIFIC COMPANY
CHICAGO

R.S.C. TULSA

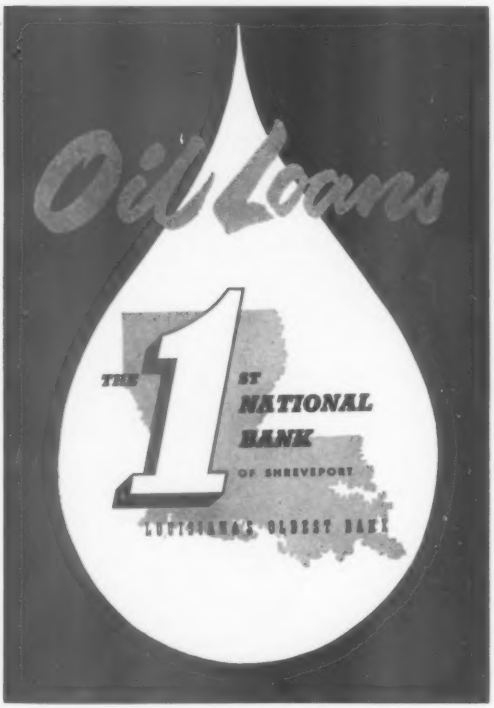
REFINERY SUPPLY COMPANY

CENCO

Laboratory Apparatus and Supplies *Oil and Gas Testing Equipment*

621-23 E. 4th St. Tulsa 3, Oklahoma

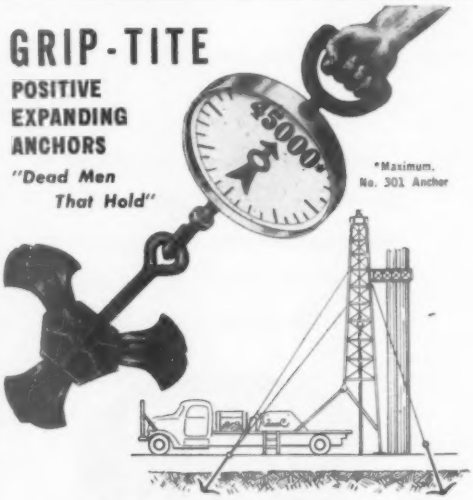
Houston Branch Office and Warehouse: 2215 McKinney Avenue, Houston 3, Texas



GRIP-TITE

POSITIVE EXPANDING ANCHORS

"Dead Men That Hold"



Built especially for oil field use. Portable drilling mast, well servicing mast, pulling truck, floor blocks, derrick guy wires, also pipe line anchor assembly, or wherever dead men are needed.

GRIP-TITE MANUFACTURING CO.

P. O. BOX 45 MARSHALL, TEXAS

Export:
R. S. Stokvis & Sons, Inc., 17 Battery Place, New York 4, N. Y.
California Representative:
Leonard Price, 249 E. 23rd St., Los Angeles 11, Calif.

resting on the supports be given the same surface preparation and coating as the rest of the hull. Recently a failure of this nature occurred on a cargo barge after only 6 months' service. While the vinyl-coated hull appeared to be in excellent condition, holes had developed in the plates which had rested on support blocks during the previous drydocking because these areas had received no preparation and coating. This is barge No. 12 listed in Table 3.

It is highly desirable that specifications covering coating application contain a clause to the effect that the applicator must obtain written approval from the operator's representative after each step of surface preparation and before each coating application. This would insure proper surface preparation and adequate coverage for each coat. Specifications should also state that the completed system shall be checked with a film-thickness gage and no area shall show less than 4.5 mils thickness. Weather conditions during coating application may seriously affect the results, and work should be delayed by the company representative, if, in his opinion, the amount of moisture in the air or on the surface would interfere with the desired results.

Specifications should require that once a barge is drydocked and sandblasting begun, the vessel shall not be lowered into the water until the entire coating system is completed, inspected, and approved by the company representative. The practice of refloating a barge into oily water causes a film to be deposited on the partially finished system that is impossible to remove by shipyard methods, and which is certain to cause bond failure.

It is highly desirable that the inspector be present when sandblasting or coating is in progress. It is a favorite practice with some shipyard operators to dismiss the inspector with the statement that no further work will be done during a specified time (usually over a week end) only to complete the coating job during his absence. This happened on barge No. 5, Table 3. One company requires that all sandblasting operations be performed during the day shift. Their specifications even include a clause to the effect that if, at any time during the coating operation, the applicator does not live up to the agreement, the contract will be canceled with no payment and no recourse on the applicator's part. This appears a bit severe, but if it is the only means of securing satisfactory performance, perhaps other companies should adopt this rule.

The amount of thinning allowed, and the type and degree of mixing should be specified. It is very important that vinyl systems not be thinly spread since the film thickness is adversely affected. In the case of vinyl primers of the phosphoric acid type, proper mixing is essential. It should be specified that adequate moisture traps be located in the air line just ahead of the dry sandblasting unit and ahead of the coating pressure pot. All coatings should be protected against air line moisture, but it is more important with vinyl materials than with conventional marine paints.

The foregoing statements and precautions may seem unduly emphasized, but in light of the costly failures resulting from careless workmanship these safeguards cannot be too often publicized.

After the rigid specifications, without loopholes, have been written, the operator is ready to receive bids from applicators. The quality and performance of past work, the general attitude of the contractor in cooperating with the barge owner, and willingness to adhere to specifications should be given as much consideration as the amount of the contract. If a company has been fortunate enough to find an applicator

MERCOID

• ALL MERCURY SWITCH EQUIPPED • AUTOMATIC CONTROLS •

These controls are used extensively on various applications in the oil field

If you have a control problem—involving the automatic control of pressure, temperature, liquid level, mechanical operations, etc.; it will pay you to consult Mercoid's engineering staff—always at your service.

WRITE FOR CATALOG 700—PLEASE MENTION THIS PUBLICATION

THE MERCOID CORPORATION
4201 BELMONT AVE. CHICAGO 41, ILL.

REPEAT — "Proper surface preparation necessary!"

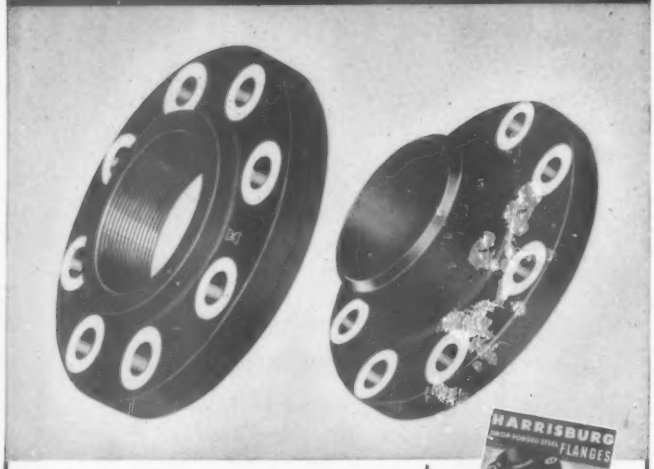
who performs satisfactory work it will be highly advantageous to so allocate the work, rather than to gamble on unknown performances. Where possible it would be desirable for the shipyard to subcontract the coating work to an applicator experienced in handling vinyl systems.

Application of Vinyl Coatings

The average ship repair yard does not seem to realize that oil company marine equipment always requires first-class workmanship on surface preparation and coating application. Ordinarily the attitude is assumed that any areas not properly prepared and coated will receive attention on the subsequent trip to drydock. However, a complete failure may occur on these skimped areas between drydockings. For this reason it is necessary that the barge owner representative be present at all times to insure that the work is done properly and specifications adhered to strictly. Without this supervision there can be no guarantee of quality workmanship.

the character of the manufacturer shows in the product

Harrisburg Drop-Forged Steel Pipe Flanges are manufactured to A.S.A. Standards. Accuracy in machining produces threads that are virtually perfect in height, angle, taper, and gauging... the result of Harrisburg's 99 years of manufacturing experience.



HF52-2

99 Years in Pennsylvania's Capital

Harrisburg Steel CORPORATION

HARRISBURG 6, PENNSYLVANIA

A copy of the Harrisburg Flange Catalog will be mailed, together with prices, upon request.

The greatest bottleneck to improved paint performance is lack of knowledge at the application level.[6] While this is true for conventional paints, it is even more important to acquaint the applicator with the fundamentals of vinyl application. A good paint applicator is not necessarily a good vinyl applicator.

After the barge is drydocked, it is thoroughly inspected to determine the extent of necessary welding and repairing to put the hull in sound condition. All too often evidence of early vinyl failure is found along welds, caused by unremoved weld splashes, welding flux, or by the porous nature of the weld itself. A heavy-duty disk-type sander or grinder could be used effectively to remove weld splashes and any residual welding flux.

The next and most important step in surface preparation is that the sandblasting.[7,8,9,10] Most contractors prefer, and in many cases insist on, wet sandblasting, since they believe this method to be more economical, easier, and cleaner. In many cases it is the only method for which the shipyard has the necessary equipment. However, it is fairly simple to adapt wet sandblasting apparatus to dry sanding. Unless inhibitors such as chromates or phosphoric acid are used with wet sandblasting the surface will immediately begin to rust and this cannot be tolerated.

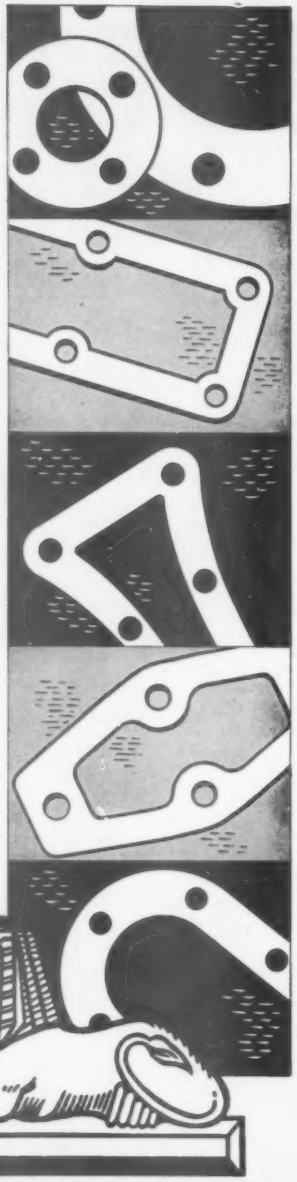
While inhibitors usually accomplish the purpose for which they are intended, their use can have a detrimental effect on the completed vinyl system. Any water soluble or hygroscopic salt, no matter how tightly adhered to the metal, can cause blistering when it is covered by a vinyl system.[7,11] This happens after the vessel is placed in service. Therefore, it is wise to insist on sandblasting to bright metal with bone dry sand before the application of the special phosphoric acid vinyl primer or "metal surface conditioner."

If staging is used it is a good practice for the operator to sandblast an area, then immediately render it dust free and apply the primer.[5] The staging is then moved and a new area blasted and primed. The newly prepared area is carried into the margin of the previously primed surface to insure complete surface preparation. This practice insures complete and prompt protection to the bare steel which would otherwise start to rust very rapidly. Vinyl primers or conditioners dry so rapidly that flying sand does not stick to the freshly coated surface.

As previously stated, the primer must be stirred with a high-speed agitator while adding the phosphoric acid, and only sufficient primer should be mixed to last for a 4-hour period. The primer material has a low pigment content and

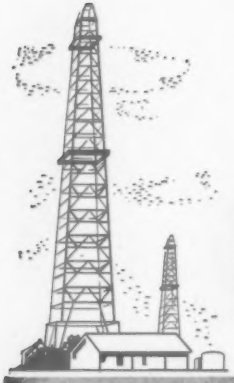
SERVICE-SUPPLY
PETROLEUM
. . . Go Hand in Hand
. . . toward meeting the needs of a nation! For the three are vital links in the chain of progress.
The needs of the Petroleum Industry are met in the field and Mid-Continent is proud of its record of Service and Supply to the industry . . . its conveniently located field stores, with the gleaming neon oil spouting derrick on top, are landmarks in oil producing areas—landmarks that oil men know mean the finest in Service, the best in Supplies.
MID-CONTINENT
Supply Company
Around the CLOCK
Around the WORLD
SERVICE!
The World's Largest
Independent Oil Field
Supply Company
General Offices, Mid-Continent Building
FORT WORTH, TEXAS

JOINTINGS *for the* PETROLEUM INDUSTRY



Our range of packings and jointings comprises qualities suited to the exacting needs of the petroleum industry and resistant to the oils and solvents used therein.

We also manufacture Cord V Belts to the A.P.I. Specification.



PERMANITE
TRADE MARK

TURNER BROTHERS ASBESTOS CO. LTD.
A MEMBER OF THE TURNER & NEWALL ORGANISATION
HEAD OFFICE AND WORKS ROCHDALE · ENGLAND

Adv

Sandblasting; primer; following coats; . . .

is not intended to have good hiding qualities; all that is necessary is to thoroughly wet the metal surface with a continuous coat.[1] When dry, the coating will have a film thickness of about 0.2 to 0.3 mils and functions as a metal conditioner. It will be semitransparent with a green or yellow hue.

Thirty minutes after application of the primer the surface is ready for the second coat, sometimes referred to as the intermediate or barrier coat. At this stage the metal is sufficiently protected to complete the entire barge before proceeding with the additional coats. This practice permits more rapid application of the top coats to the entire area.

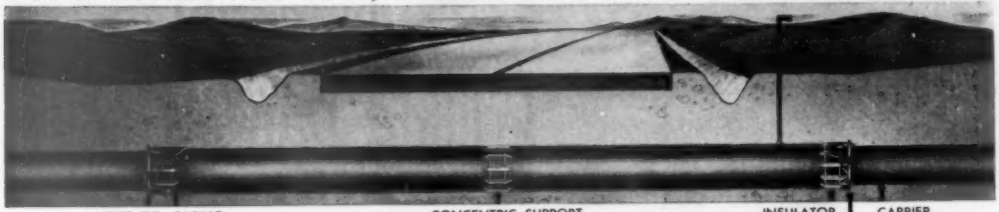
Some manufacturers recommend the application of two intermediate coats, and the laboratory tests indicate that this is advantageous. A minimum of 1 hour drying time should be allowed between coats and each application should be of a different color to insure even coverage. As many additional top coats are applied as are necessary to complete the specified system. The manufacturer's recommendations should be followed carefully in thinning the coating.

After the system has been completed the surface should be checked thoroughly with a film-thickness gage to insure adequate film thickness of at least 4.5 mils.

The points requiring special attention by the company inspector during painting and repairs are listed for emphasis:

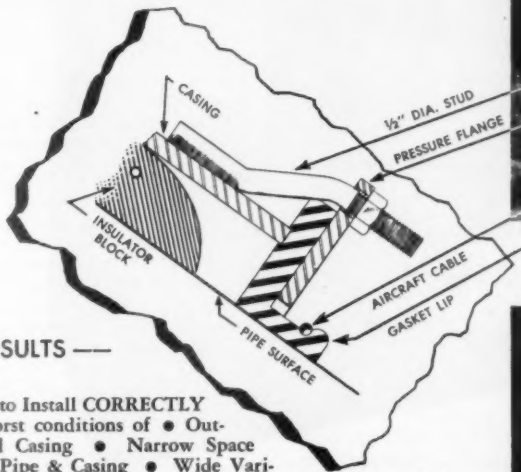
1. Be sure the hull is repaired, if necessary, and is in sound condition before surface preparation begins.
2. Check all welded areas for removal of splashes and flux.
3. Insist on bone dry sandblasting to bright metal; permit sanding only on dry days. Check relatively inaccessible areas for adequate preparation and coating.
4. Do not permit the barge to be lowered into the water after sandblasting until the coating system is complete and the work has passed final inspection.
5. Be sure sandblasted surfaces are dust free before application of primer; surfaces must be free of moisture before vinyl coating is applied.
6. No coating shall be applied during fog, mist or rain, nor shall any coating be applied after a rain until the surface is dry enough to meet the inspector's approval.
7. Primer shall be applied within a few hours after sandblasting; the sooner the better.
8. Check the mixing and thinning of vinyls before adding to the paint pot. Be sure the paint pot and lines are perfectly clean before adding the vinyl.
9. Be sure that each coat is applied evenly and completely; sags and drips are to be avoided. A heavy single coat is more undesirable than one too thin. Adequate film thickness, evenly applied, gives the desired results.
10. After completion of the coating system

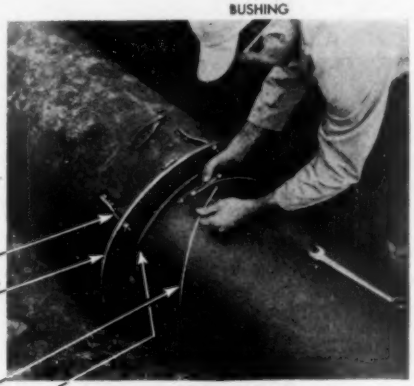
PIPE-LINE TESTED, PROVED and ACCEPTED in '51



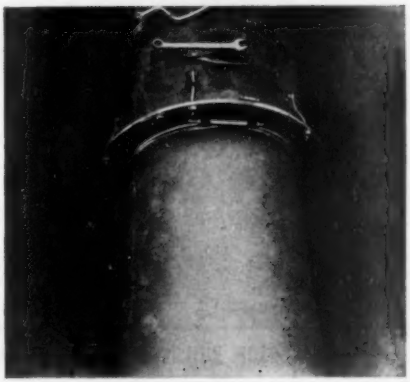
TYPE "L" WmSEAL CASING BUSHING*

A New Design: It BUTTS Against End of Casing Instead of Fitting Inside the Casing.





Assembling cable with rubber-covered union for clamping gasket lip to pipe.



THE COMPLETED INSTALLATION
Note that galvanized cable and union are insulated from pressure flange and from pipe.

RESULTS —

1. Easier to Install CORRECTLY under worst conditions of • Out-Of-Round Casing • Narrow Space Between Pipe & Casing • Wide Variations in Casing Wall and Coating Thickness • Mud • Casing ends beveled — by machine or hand torch.
2. WATER-TIGHT Seal with "L" gasket . . . . . .
   - BUTTED AGAINST CASING as pressure flange is tightened on ½" studs welded to casing.
   - TIGHT TO THE PIPE as aircraft cable (4,600# tensile) is tightened to gasket lip. Union is rubber covered to INSULATE galvanized cable assembly from bare casing structure.
3. Always Insulated from the pipe line when a Concentric-Support Insulator is installed just inside casing after the "drag section" is in place.

AS STRONG & DEPENDABLE AS THE MEN WHO INSTALL THEM

REPRESENTATIVES

Stuart Steel Protection Corp. Kenilworth N. J. | H. E. Davis Los Angeles 15, Calif. | James S. Kone Co. Amarillo, Texas | Keyes Tank Co. Provo, Utah | Keyes Tank & Supply Co. Casper, Wyoming | Canadian Equipment Sales & Service Co., Ltd. Edmonton, Calgary, Toronto, Canada

*Patent Pending

WRITE FOR BULLETIN 249A

T. D. Williamson, Inc.
TULSA 9, OKLAHOMA

8,000 Pipe Line Casings installed in 1951 with Williamson Bushings and Insulators

Submersible Drilling Barges-

"A COMPLETE PACKAGE"

BY

Levingston

From crown block to barge bottom, Levingston is prepared to accept the entire responsibility of constructing and rigging-up your submersible drilling barges, on a turn-key basis. You select the tools, or equipment, and Levingston's experienced organization will install them for safe and efficient operation on marine locations.

LEVINGSTON BUILDS FINE SPECIALIZED MARINE EQUIPMENT FOR THE PETROLEUM INDUSTRY

Non-self propelled oil well drilling tenders—converted LST's

Drilling barges converted from navy seagoing barges.

Self-propelled oil well drilling tenders—converted Lst's

Submersible drilling barges

Vessels for geophysical exploration

Crew boats

Boiler and power barges

Compressor barges

Water, oil and supply barges

Levingston

SHIPBUILDING COMPANY • ORANGE, TEXAS

Tugs

Pointers for inspection of vinyl coatings.

check for film thickness in several locations and give special attention to angles, edges, and inaccessible areas.

After a barge has been repaired and coated under constant supervision and it is returned to service, field performance is followed closely in order to determine which of the laboratory tested systems proves superior under commercial application and field operation conditions.

Performance

One of the major oil companies, operating in the Gulf Coast area, maintains a schedule of semiannual inspection as a means of detecting and controlling coating failures on heavy marine installations. Included in the floating equipment are three types of barges, i.e., the drill barge consisting of twin hulls measuring 100 by 24 by 10 ft., spaced 8 ft. apart and held together with spacing and reinforcing bars; another is the boiler barge, 100 by 32 by 10 ft., which transports the boilers for furnishing steam to the drilling rig. The third type is the cargo barge, of which here are two sizes: one measures 92 by 26 by 6 ft. and the other 75 by 16 by 5 ft. These are used for hauling water, supplies for drilling, pipe, casing, tubing, service trucks, etc.

The three main points of coating failure are the deck, hull sides, and hull water line. Barge decks are subjected to abrasion from the heavy cargoes which are constantly loaded and unloaded. Hull sides are damaged through abrasive action against dock installations and other floating craft. Water line areas are subjected to alternate wetting-drying conditions which adversely affect the coating system.

Accurate records of data obtained during the field inspection are maintained, and from these data the most suitable vinyl system for field use is selected. An illustration of the inspection record is shown in Table 3. Data are included showing the type of vessel, coating system used, date of application, and a brief description of service life and type of failure. For comparison, the same information is given in Table 4 for three barges that were prepared by sandblasting, coated with wash primer, regular primer, and two coats of marine paint.

It will be noted that the chief difference between the vinyl and marine paint systems lies in the cause of failure. Abrasion of the coated surfaces on vessels protected by vinyls is the major factor in failure, while peeling and blistering, as well as abrasion, are the chief causes of failure to a marine

FOR RIGGING UP EQUIPMENT—
SETTING BOILERS, SLUSH PUMPS,
COMPRESSORS, DIESEL AND
GAS ENGINES, TIGHTENING BELTS,
LIFTING AND LOWERING PIPE,
LARGE VALVES, ETC.
. . . YOU CAN'T BEAT

DUFF-NORTON JACKS

The No. 1523 ALL-PURPOSE Oil Field Jack

The hinge or pivotal base of this Duff-Norton 4-Way Jack permits operation of the jack from any angle for lifting, lowering, pushing or pulling loads weighing up to 15 tons. Sturdy steel chain fits into slots on top of jack and can be used as a sling to engage heavy objects being lifted or lowered. Convenient to handle and spot, this jack can be operated by one man.

No. 1523

QUICK REFERENCE DATA

Jack No.	Capacity Tons	Height Inches	Raise Inches	Base Inches	Head Inches	Foot Lift Ht. Inches	Weight Pounds
1523	15	23	12½	7½x10¾	3x3	2¼	98

Furnished with steel operating lever 1¼" x 48" long, and 5 feet of ½" BBB chain (13¾ lbs.)

STRENGTH SAFETY DURABILITY
DUFF-NORTON JACKS
ESTABLISHED 1883

Write for Catalog AD-19U.

THE DUFF-NORTON MANUFACTURING CO.

MAIN PLANT and GENERAL OFFICES, PITTSBURGH 30, PA.—CANADIAN PLANT, TORONTO 6, ONT.

"The House that Jacks Built"

Recommendations for improving vinyl performance...

coating. Failures occur sooner in marine paints, leaving the metal surfaces open to attack by heavy rust and scale.

The majority of these barges were coated with primer, one intermediate coat, and one top vinyl coat, which gives a film of 2 to 2.5 mils. Recently, it was decided to apply one additional top coat, thereby increasing the film thickness by 1 mil. In spite of this thin coating, the major cause of loss has been abrasive action rather than peeling or deterioration of the protective film itself. It might be stressed that several failures occurred on weld seams where coating was applied over scale. Other areas of failure have been found in depressions or pockets where water stands for long periods.

Although barnacles and other marine growths adhere to the vinyl coatings, they do not penetrate or damage them as is the case with marine paints and other softer finishes. It has been found unnecessary to apply antifouling coating to these barges since it offers no added protection against corrosion.

The necessity for rigid inspection and control of surface preparation has been discussed, and this practice will be emphasized on future work with which the author is associated.

To improve coating life over weld seams and sharp edges it is intended to recommend a brush application of heavy vinyl mastic on such areas, following the phosphoric acid vinyl primer, followed by the regular vinyl system. Special attention will be given to deck areas of cargo barges where mechanical abrasion is the major cause of coating failure by the following recommendation: thoroughly dry, sandblast, and immediately apply a vinyl metal conditioner, anticorrosive coat, top coat, and a heavy application of vinyl mastic of 20 to 30 mils thickness to the entire deck area. For the sake of appearance a finish coat of the desired color may be applied, which would also serve as a seal for the vinyl mastic. It may be found desirable to test a portion of the outer hull with this system to determine its resistance to mechanical abrasion.

Over a year ago Scott[5] reported this vinyl mastic as offering promise, and he now reports that it is the only system yet found that will stand up in the most severely affected areas.

Acknowledgment

The author wishes to thank the management of Gulf Oil Corp., Gulf Production Division, for permission to publish this paper. He also wishes to express his appreciation to friends with other companies doing similar work for some of the information used in the preparation of this paper.

References

1. G. L. Pitzer: Vinyl Resins Defeat Corrosion. Address to local section, N.A.C.E., Houston, January 10, 1950.
2. G. W. Seagren: Organic Coatings for Corrosion Protection, A General Discussion. Corrosion, Vol. 4, No. 5, May 1948.
3. Jack P. Barrett: A Method for Selecting Protective Coatings for Offshore Drilling Structures. Corrosion, Vol. 6, No. 11, Nov. 1950.
4. A. C. Elm: Paints as Moisture Barriers. Federation of Paint and Varnish Production Clubs, April 1947.
5. J. B. Scott: How to Protect Your Steel. Chem. Eng. 58, No. 4.
6. J. B. Scott and Kenneth Tator: More About Protecting Your Steel. Chem. Eng. 58, No. 9.
7. C. G. Munger: Surface Preparation for Anticorrosive Coatings. World Oil, Oct. 1950.
8. G. W. Seagren: The Importance of Surface Cleaning for Metal Finishing. Corrosion and Materials Protection, Jan. 1946.
9. A. J. Liebman: Surface Preparation Values and Sandblasting Economics. Corrosion, Vol. 6, No. 5, May 1950.
10. First Interim Report: Recommended Practices for Surface Preparation of Steel, TP-6G. Surface Preparation of Organic Coatings. Corrosion, Vol. 6, No. 8, Aug. 1950.
11. R. E. Gwyther: Preparation of Metals for Coating. Corrosion and Materials Protection, March-April 1947.

"Yes, sir, with Foster Catheads you get easy operation and durability, too, because of well lubricated heavy bearings. (Be sure to use only soft or semi-fluid grease.)

"The superior design of these Catheads . . . perfection in design and manufacture acquired by more than a quarter century of specialization . . . assures you of years of top performance.

"If you're not already using our Safety Rope Guard, better check into it now. This Safety Rope Guard attaches to any Foster friction cathead. It is inexpensive and easy to install."

Here are features on both the Air Master Breakout and Air Spinning Catheads: Precise control . . . No adjustments . . . Direct diaphragm actuated . . . Instant disengagement . . . Crawl free drum . . . Fully enclosed . . . Quick change jerkline . . . Peak performance PLUS . . . Triple plate clutch on the Air Master Breakout . . . and single plate friction clutch for line pulls up to 12,000 lbs. on the Air Spinning Cathead.

There's a Foster Cathead for Every Need.

Foster CATHEAD COMPANY
P O BOX 1675 WICHITA FALLS TEXAS
FACTORY REPRESENTATIVES
O W Frogge Casper Wyo | Greenhead Service Co Oklahoma City Okla | Tillery & Parks Odessa Texas | R D Clanginger Lafayette La | R N Bean Los Angeles 15 Cal

After two years of development and test work confirmed in the operation of the large West Texas installation pictured below,

HUDSON presents the

Combin-aire*

A New Type Cooling System Integrated for All Process Plant Cooling Services, Combining the Economical Maximum Use of Air With Minimum Use of Water.

In the COMBIN-AIRE the use of air for cooling is extended to include low temperature cooling services previously necessitating water cooling because of high ambient air temperature. The COMBIN-AIRE allows the use of air-cooling for total heat dissipation in all services.

The COMBIN-AIRE is a combination of a HUDSON water cooling tower with HUDSON air-cooled exchangers housed in one integrated structure. During periods of high ambient temperature the inlet air is first drawn through water at the bottom of the cooling tower, reducing the air to near wet bulb temperature, at which temperature it contacts the air-cooled exchangers. During periods of low ambient temperature the inlet air is used directly in the air-cooled exchangers and no water is evaporated in the cooling tower.

When water in good quantity and quality is not available the COMBIN-AIRE has manifest advantages over any alternative combination of cooling equipment.

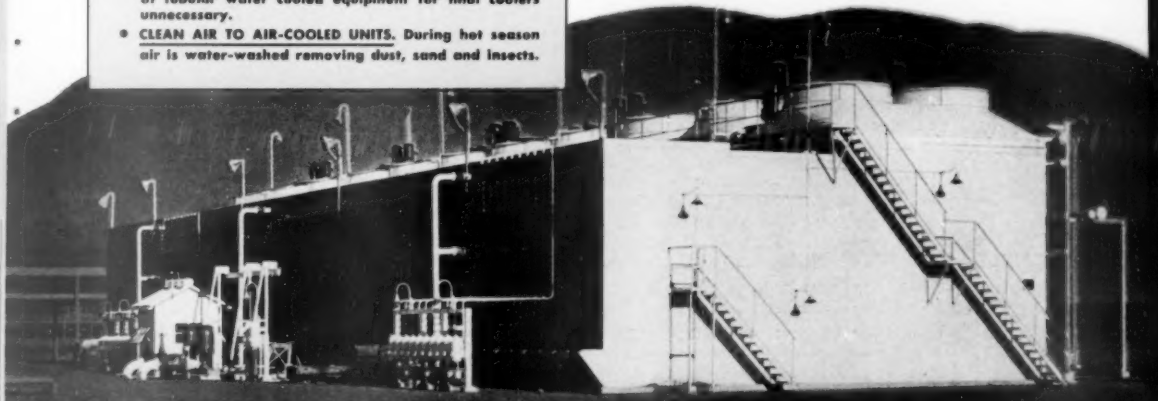
Even when ample water is available and water treatment costs are low, comprehensive comparisons will frequently indicate overall advantages of the COMBIN-AIRE system.

*** The COMBIN-AIRE unit is protected by United States patents**

COMBIN-AIRE ADVANTAGES

- **LOW WATER CONSUMPTION.** No water is used during cold weather.
- **NO TREATMENT NECESSARY** for cooling tower water.
- **NO WATER LOSS** as spray or mechanical carryover.
- **NO CONDENSATION** from effluent air.
- **MINIMUM PIPING.** COMBIN-AIRE may be installed immediately adjacent to other process equipment. Use of tubular water cooled equipment for final coolers unnecessary.
- **CLEAN AIR TO AIR-COOLED UNITS.** During hot season air is water-washed removing dust, sand and insects.

HUDSON
ENGINEERING CORPORATION
FAIRVIEW STATION • HOUSTON, TEXAS



This COMBIN-AIRE unit operated by the Plymouth Oil Company at their [illegible] refinery [illegible] heat from oil absorption and fractionating plant streams, or [illegible]

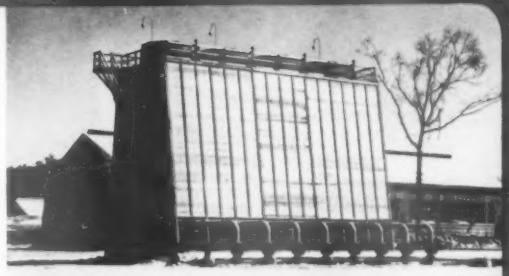
HUDSON

Top Performance

COOLING EQUIPMENT

WATER COOLING TOWERS

Beauty and utility have been successfully combined in the HUDSON "TP" design. These Top Performance cooling towers embodying new but proven advancements in water cooling design, result in lower installation and operating costs for a given guaranteed performance.

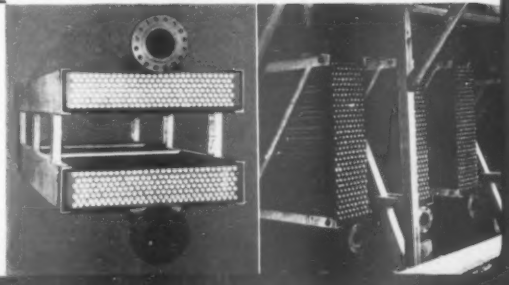


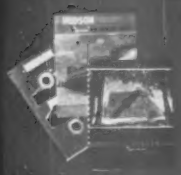
SOLO-AIRE UNITS

HUDSON SOLO-AIRE UNITS for jacket water cooling, gas cooling, steam condensing and hydrocarbon vapor condensing have found wide use, particularly where suitable cooling water is impossible or expensive to obtain. Even where adequate quality and quantity of water is available there are conditions under which these units have marked advantages over alternative cooling methods. Designs are available for pressures up to 5,000 pounds per square inch.

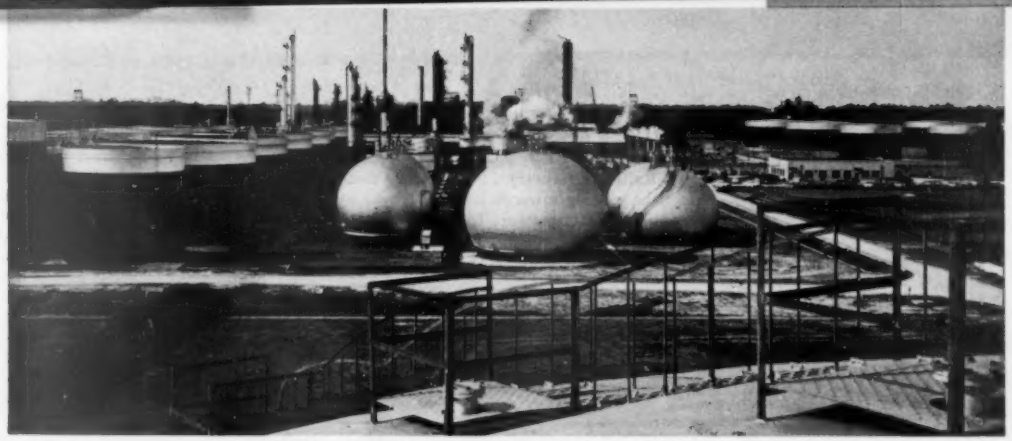
ATMOSPHERIC SECTIONS

These units are for use where water serves as cooling medium. They may be mounted vertically or horizontally, under cooling tower or submerged in water.





HUDSON
ENGINEERING CORPORATION
FAIRVIEW STATION • HOUSTON, TEXAS



PROCESSING EQUIPMENT and storage tanks at Conoco's Lake Charles refinery.

New SO_2 Aromatic Extraction Unit Being Installed by Conoco at Lake Charles

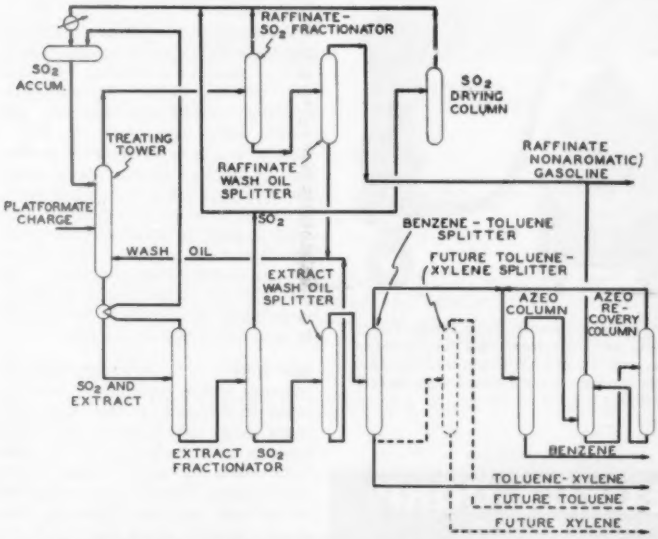
by F. Lawrence Resen
Gulf Coast District Editor

A SULFUR dioxide aromatic extraction unit, which can easily be shifted into defense production of aromatics or peacetime refining of distillates, is being erected as part of a general expansion program at Continental Oil Co.'s Lake Charles, La. refinery.

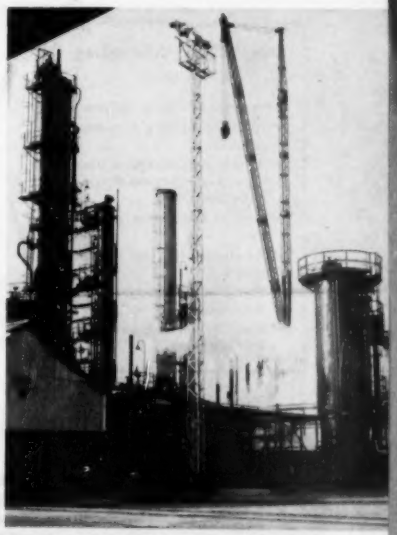
The double duty to be performed by the unit is part of an outgrowth of developments which saw extensive changes being made within various plants as they attempted to shift from wartime production into peacetime production, and then another group of changes being required to get back into substantial defense production.

By making the installation at Lake Charles versatile in nature, Conoco hopes to achieve a balance in its refining setup which will allow the plant to meet shifting demands without any great lag in time and without extensive modifications being necessary in the process.

Extraction unit . . . The 3,570 bbl. extraction unit is designed first to re-



FLOW SHEET of 3,570-bbl. extraction unit shows steps in purification of aromatics. Unit employs sulfur dioxide to separate aromatics, and utilizes closed system for SO_2 recovery.



DERRICK BOOM at work on $24,000,000 refinery expansion. Crude fractionator, furnaces, and water treater are also shown.

move the aromatics from a platformate, and then in following sequences to selectively separate the aromatics in splitter towers. The unit employs sulfur dioxide as the main extraction agent and incorporates a closed system for the recovery of the SO_2.

Treating tower . . . Main tower in the extraction unit is the treating tower. The platformate feed stock enters about the middle of the tower and the sulfur dioxide stream is charged at the top of the tower. Wash oil from the raffinate and extract wash-oil splitters enters at the bottom. The wash oil is used to displace light paraffins from SO_2 extract and is subsequently separated from aromatics by distillation.

Raffinate recovery . . . Raffinate from the treating tower is taken overhead to a condenser-pressure fractionator. Here the SO_2 is removed and taken overhead into a common SO_2 line, and the fractionator bottoms are then charged to a raffinate-wash oil splitter. The wash oil removed from the raffinate is then returned to the system for continued usage. The raffinate is caustic washed and then sent to storage for use in blending with motor gasoline. In a stream day, 1,750 bbl. of raffinate will be produced.

Extract recovery . . . Extract from the treating tower passes first through a high-pressure tower where some of the SO_2 is removed. The bottoms from the high-pressure tower are then charged to a condenser-pressure tower where the remaining SO_2 is removed and returned to the common SO_2 system. Bottoms from the extract condenser-pressure tower will then be charged to the extract wash-oil splitter tower, from where wash oil will be removed and returned to the system for continued usage.

Benzene . . . The aromatics stream is fed as charge stock to the benzene column after SO_2 and wash-oil separation. Here the benzene stream is split out from the toluene and xylene cut. Raw benzene is taken overhead and passed through a caustic wash drum and is then charged to the azeotrope tower. Benzene of satisfactory purity for most purposes is produced directly from the SO_2 process, while azeotropic distillation is used as a finishing step for nitration-grade material.

In the azeotrope tower the remaining small amount of nonaromatics is taken overhead while benzene is removed in the bottoms. The azeotropic agent is removed from the benzene by water washing and the nitration-grade benzene product is sent to storage.

The azeotropic agent and water recovered from the wash tank are charged to a fractionator wherein the azeotropic agent is recovered for recycle to the process.

Toluene-xylene . . . Toluene-xylene bottoms from the benzene column will be sent to storage for blending with aviation gasoline under proposed initial operating conditions. However, provisions have been made so that a switchover can be made to the production of nitration-grade toluene should the need ever arise. This would necessitate the addition of a toluene-xylene splitter tower in which the two products would be separated and sent to storage directly from the tower. The plot plan is so laid out that the incorporation of the toluene tower would be a minor change in the unit.

SO_2 system . . . The sulfur dioxide-recovery system provides for a drying tower to be used for the removal of water from the solvent. This tower operates on a slip stream of SO_2 vapor from which the water is separated by fractionation. The SO_2 after being dried is fed back into the system for reuse in extraction of aromatics.

The sulfur dioxide circulating in the plant is noncorrosive as long as its

Here's What One Major Oil Company Accomplished

Saved $18,450.00

Reduced Fishing Time 77%*

(in one year)

By controlling tong torque and increasing drill collar service with the MARTIN-DECKER TONG TORQUE GAUGE

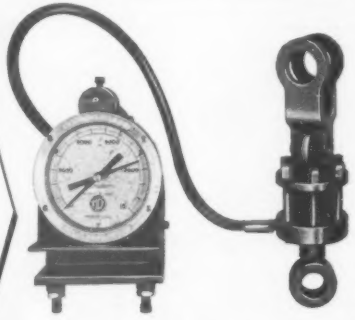
The Martin-Decker Tong Torque Instrument removes the two basic causes of drill collar failures—*overtonging*, which results in pulled and distorted threads, and *running collars too loose*, which allows the joints to work, resulting in cracks and washouts.

The Martin-Decker Tong Torque Instrument is simple in construction and design, consisting of a hydraulic unit attached to a gauge by means of high-pressure hose. It can be set to any desired value and is always in a position where it can be easily seen by the operator. It is quickly mounted or removed from the tong handle by means of a pin.

Check These Outstanding Features

- Prevents drill collar failures.
- Ideal for checking automatic cathead.
- Establishes and holds a maximum pull regardless of operating variables.
- Easy to install and easy to use.
- Adjustable for any desired torque.
- Highly portable, rugged and dependable.
- Available for all sizes of collars and joints.

Write for descriptive literature!



*The Martin-Decker Tong Torque Gauge was not solely responsible for the entire savings, but this instrument made possible the program of controlling torque on drill collars.

HOME OF THE WEIGHT INDICATOR

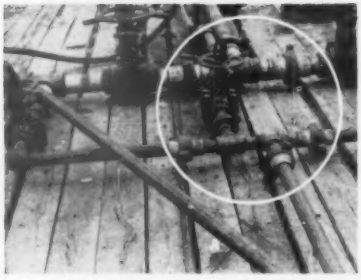
MARTIN DECKER CORP.

LONG BEACH, CALIFORNIA

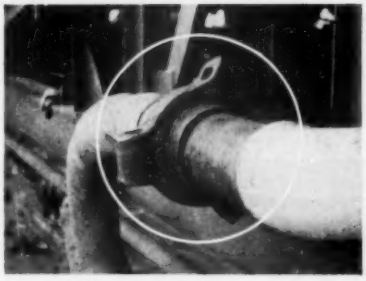
SAN JOAQUIN VALLEY: T. F. CULLEN, BAKERSFIELD, CALIFORNIA
MID CONTINENT DISTRIBUTOR: REED ROLLER BIT COMPANY, HOUSTON, TEXAS
CANADIAN DISTRIBUTOR: REED ROLLER BIT COMPANY OF CANADA, LTD., CALGARY & EDMONTON, ALBERTA

It's Wise to Standardize with WECO

MOST COMPLETE LINE OF WING UNIONS IN THE WORLD

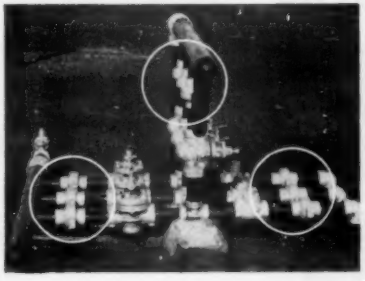


WECO Fig. 600 Unions on a mud line manifold. "Standardize with WECO" for this service to save time and trouble.



This WECO FIG. 100 on a mud return line can be made up with hammer or bar.

Four inch FIG. 602 on pump discharge withstands severe vibration and pulsation without leaking.



These versatile FIG. 400 WECO UNIONS speeded assembly of this production tank header.

● Standardizing with WECO UNIONS saves time, reduces cost, minimizes errors, avoids misfit and makeshift connections. WECO's "Most Complete Line of Wing Unions in the World" gives you exactly the size, type and pressure union you need for every oil field service.

WECO UNIONS give you leak-proof connections . . . withstand years of hard use and service . . . make-up and break-out repeatedly without damage to threads or seat. Perfect interchangeability of parts in same size and pressure assures maximum efficiency in piping layouts, particularly where they are disassembled and re-assembled frequently, such as on the drilling rig.

SOLD EXCLUSIVELY THROUGH SUPPLY STORES

FIG 100
1000 p.s.i. TEST
SIZES: 2", 2½", 3", 4", 6", 8"

FIG. 200
2000 p.s.i. TEST
SIZES: 1", 1½", 1½", 2", 2½"
3", 4", 6", 8"

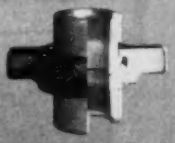


FIG 400
4000 p.s.i. TEST
SIZES: 2", 2½", 3", 4", 5½" O.D.,
6", 7" O.D., 8", 10"

FIG 600
6000 p.s.i. TEST
SIZES: 1", 1½", 2", 2½", 3", 4"

FIG. 602
6000 p.s.i. TEST
SIZES: 1", 1½", 2", 3", 4"

FIG 1502
15,000 p.s.i. TEST
SIZES: 2", 2½", 3"

It's Wise to Standardize with... **WECO**

WELL EQUIPMENT MFG. CORP.
Division of Chiksan Company
HOUSTON 1, TEXAS
Exclusive Sales Representative Outside Mid Continent Area
CHIKSAN COMPANY
Brea, Calif. Chicago 3, Ill. Newark 2, N. J.
Export Sales: CHIKSAN EXPORT COMPANY, Brea, Calif. Newark 2, N. J.

Manufacturers and Distributors of Oilfield, Refining, Marine and Industrial Equipment

water content is kept at a safe level. With water used as coolant in the SO_2 condensers, certain precautionary measures have been taken. An alarm arrangement has been tied in with water from the SO_2 condensers whereby continuous pH measurements will be made. Whenever the pH becomes excessive, the alarms will actuate so that the contaminated water may be diverted from the cooling tower. In addition a parallel condenser arrangement will be made in these instances so that a faulty condenser may be immediately removed from service and repaired while its mates will be able to take over so that the unit may function normally.

A common control house will be set up to handle both the aromatic extraction unit and also the Platforming unit which feeds into the aromatic section. A similar common installation will be the compressor building. Procon, Inc., who is building the Platforming unit, will install the compressors for the Platformer in this building.

Charge conditions . . . In operating the two units, the Platformer will be operated about 30 per cent of the time for the improvement of the octane number of the naphtha charge. The remaining 70 per cent of the time, aromatic production, which will then be charged with special heart-cut gasoline, will be the object of Platformer operation. Under aromatic conditions, the Platformer will operate blocked, the special stock will be charged, and the product will be stored for entering the extraction unit on a continuous basis.

The charge to the Platformer for octane improvement will be a reforming-naphtha cut. The charge for aromatic extraction purposes will have an initial boiling point of 178° and a dry point of 225° F.

The aromatic extraction unit will have a charge capacity of 3,570 bbl. per stream day, all of which will be obtained from the Platforming unit. The extraction unit will then produce 320 bbl. of benzene, 1,200 bbl. of toluene, and 300 bbl. of xylene—the latter two combined in one stream for initial operation—and 1,750 bbl. of raffinate.

Plant expansion . . . The Platforming and aromatic extraction units are part of a $24,000,000 expansion program currently under way at the Lake Charles refinery. The program will more than triple the rated daily capacity of the plant, increasing it from 12,000 to 40,000 bbl. of crude-oil charge.

Facilities to be added to the plant include a twin T.C.C. catalytic cracking unit incorporating air lift for the catalyst flow, crude-distillation unit, polymerization unit, and a gas-recovery unit.

The present alkylation unit is being revised and enlarged to increase production to approximately 2,400 bbl. daily of alkylate required for fighter-grade aviation gasoline. This stock will have a performance rating of 115-145.

These facilities, together with the SO_2 extraction unit, are being designed, engineered, and constructed by the Badger Process Division of Stone & Webster Engineering Corp.

Lube oil . . . The enlarged refinery will include several processing units of the most modern design and specifically planned for products of the highest quality, including fighter-grade aviation gasoline, motor gasoline, kerosine, burner distillate, and diesel fuel oil. Selected crude oils will be segregated and especially processed in the plant to produce a high-quality residuum, which will be pumped to the Cit-Con Oil Corp.'s nearby plant for the manufacture of high-viscosity-index lubricating oils.

QUACHROM
GLUCOSATE*
corrects
SEVERE
CORROSION
In the Petroleum Industry where severe corrosion is encountered, Haering's Quachrom Glucosate is constantly used for preventing downtime and increasing life of Heat Exchange equipment.
Write for our book, "Organic Methods of Scale and Corrosion", which tells graphically how Haering Glucosates have corrected scale and corrosion in many plants.
WE READ WATER
H-O-H
ESTABLISHED 1931
*Reg. U. S. Pat. Off.
D. W. HAERING & CO., INC.
GENERAL OFFICES
P. O. BOX 6037 SAN ANTONIO, TEXAS
CHICAGO OFFICE: 205 West Wacker Drive

Derricks used in drilling directional wells under river, to left of picture, in Phoenix Lake field, which straddles Louisiana and Texas.

Crow Drilling Co., Shreveport, Rig No. 5 drilling the E. W. Brown in Phoenix Lake field.

PROGRESS REPORT:

Gulf Coast's Two-State Phoenix Lake Field

Development of this field poses problems, including coordination of state conservation laws

Fig. 1—Sketch map showing location of the two-state field, Phoenix Lake.

by R. M. Wilson

PHOENIX LAKE field is located in the extreme southwest corner of Calcasieu Parish, Louisiana, adjacent to Phoenix Lake, for which it was named, and extends across the boundary line between the State of Louisiana and Texas into Orange County, Texas. The field lies 35 miles southwest of Lake Charles, parish seat of Calcasieu, and just east of Orange, county seat of Orange County, Texas. It is approximately 3½ miles southwest of Vinton field in Calcasieu Parish, 4 miles northwest of Black Bayou field in Cameron Parish, both in Louisiana, and the same distance southeast of the Orange field in Orange County, Texas. Jennings field in Jefferson Davis Parish, Louisiana is 65 miles northeast, and Spindletop field in Jefferson County, Texas, is 20 miles southwest of this field.

Physiography . . . Phoenix Lake field lies within the Gulf Coastal Plain and has a surface elevation of about 5 ft. The normal drainage is into the Sabine River, which traverses the field. The area is marsh land and supports a prolific crop of tall cane and marsh grass. Because of the low surface elevation and the close proximity to the Sabine River, the area remains covered with water throughout most of the year. Muskrat trapping in the marsh area was the chief industry prior to the discovery of the field.

History of Discovery

It is unusual that this field remained undiscovered for so long a time. The early torsion-balance work in the United States was commenced in this general locality. This tool proved itself very adaptable for locating salt dome structures such as Spindletop and Jennings, and consequently initiated a vigorous effort on the part of many operators to survey the accessible area of the Coastal Plain with the instrument.

According to the early geophysical scout records, this area had not been worked in detail with the balance. Some of the early prospect maps showed the area to be prospective. By inference, then, it might be assumed that the early torsion-balance surveys

yes Sir...

there's a reason why...

M. J. Delaney Drilling Co. uses...

LeBus Grooving & Controlled Pyramid Spooling System

★ **SAVES...**

DRILLING TIME
WIRE LINE
CREW ACCIDENTS

Harry T. Jewel, Drilling Superintendent says, "We are more than well satisfied with LeBus Grooving and Pyramid Spooling System. ... Its cost was well justified as it will pay for itself many times in the amount of drilling time and wire line saved." E. C. Smith, Toolpusher, states, "before we grooved this rig it took us 4½ hours to go into the hole (12,000 ft. depth)... after installing LeBus Grooving, we went into the hole in less than 2 hours..." Statements such as these show why LeBus Grooving is an important development. Contractors who wish to conserve in these times of critical steel shortages and rising labor costs are installing the LeBus Grooving and Controlled Pyramid Wire Line Spooling System. You'll profit by calling a LeBus Representative... let him give you full information.

COMPLETE SALES and SERVICE EVERYWHERE

COMPLETE LITERATURE UPON REQUEST

LEBUS INTERNATIONAL ENGINEERS LIMITED

SALES, SERVICE Control and Warehouse Stock: LONGVIEW, TEXAS
Executive Offices: 300 Wichita National Bank Bldg., WICHITA FALLS, TEXAS

"Seismograph showed complexly faulted anticline . . ."

suggested an anomaly in close proximity to Phoenix Lake field. Records show that a gravity survey of ½-week duration was conducted in 11s-13w during May 1935. In 1937 another survey of the same type and of 3 weeks' duration was made in the same area.

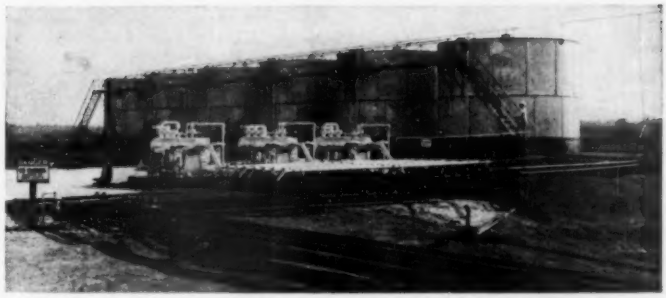
Records also indicate 1 weeks' work by reflection seismograph during November 1934. Seismograph work had been done in the early 1930's on the west side of the Sabine River in Orange County, Texas, west of the present location of Phoenix Lake field, and a number of the major oil companies were leaseholders in the area. The inaccessibility of the area east of the Sabine River, for geophysical work, may account for the sporadic development which retarded the discovery of this field.

In April 1938 The Texas Co. drilled its 1 Bill Stark well, located in the Stephens Jett Survey of Orange County, Texas. This well was drilled to a total depth of 8,399 ft. and penetrated the upper Frio sands. The well was abandoned as a dry hole. In June 1941, Jack Frazier et al drilled the 1 Brown well, located just west of the Sabine River in the C. L. Higginbotham Survey of Orange County, Texas. This well was drilled to a depth of 8,511 ft. and penetrated the upper Frio sand zone. It is assumed that early seismograph work in this area led to the drilling of these wells.

Ohio Oil Co. commenced a detailed gravity survey of the marsh area adjacent to the Sabine River in Calcasieu Parish, Louisiana, around Phoenix Lake in May 1948. Encouragement from Lloyd Traupe and C. L. Moody inspired Bob Reynolds, party chief on the gravity troupe, to get stations in the marsh under most difficult conditions. A very nice gravity anomaly was interpreted from this data.

On the strength of the gravity anomaly, Ohio Oil Co. commenced a seismograph survey of the Phoenix Lake area in February 1949. A very detailed reflection seismograph survey was made, and from the data a complexly faulted anticline was interpreted. It is the writer's opinion that without detailed gravity and seismograph surveys, the anomaly could not have been mapped, and the field might still remain undiscovered.

Discovery well . . . After considerable thought and planning, Ohio Oil Co. elected to make the initial exploration test on this prospect a semi-marine one. A canal was dredged along the south bank of Phoenix Lake, thence



Horizontal separators and tank battery No. 1 on E. W. Brown, Jr., lease.

northeast to the location in SE SE 20-11s-13w. The drilling rig and machinery were supported on piling at the location. On December 6, 1949, Ohio spudded the 1-A E. W. Brown.

Eighty-six wire-line cores were cut at intervals between depths 7,572 to 9,510 ft. in this test. A series of sidewall samples was taken in the possibly productive sands for a better evaluation of the fluid content. Oil was recovered in a series of drill-stem tests from the Brown "A-1," Brown "B," and, 8,400-ft. sands. It was concluded from these data that the above sands, and the Brown "A" sand were potential oil reservoirs. Heaving soft shales and thin sands with high-head salt water flows were encountered as the drilling progressed below 9,500 ft.

The hole was plugged back and completed on March 19, 1950, as a producer from perforations between depths 7,781 to 7,782 ft. in the Brown "A" sand. This well flowed initially at the rate of 292 bbl. of oil per day through a 10/64-in. choke, and had a gas-oil ratio of 795:1. The tubing pressure was 1,475 psi. and the casing pressure 1,175 psi. Gravity of the oil was 43.1°.

Development . . . To facilitate the de-

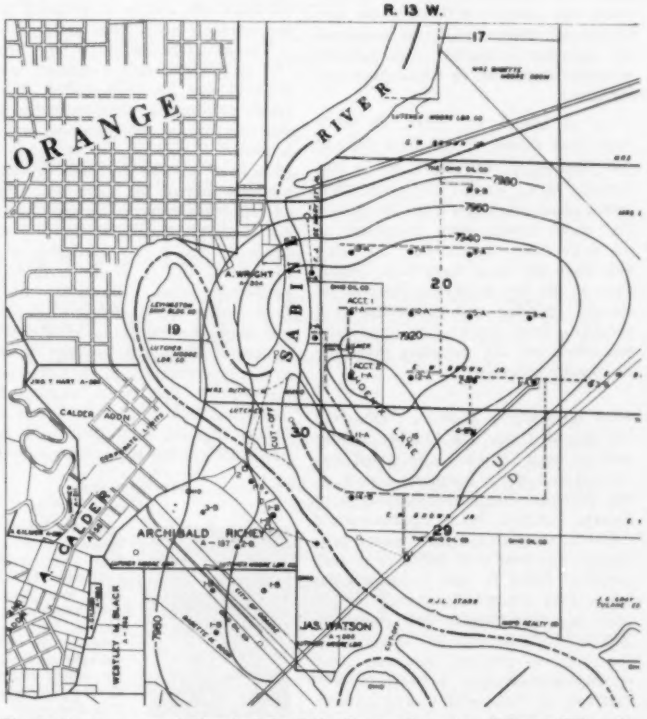


Fig. 2—Structure map of Phoenix Lake field. Contoured on top of Brown "B" sand.

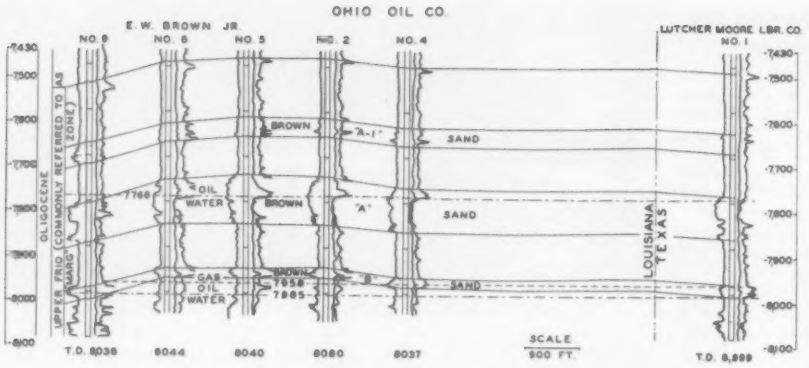


Fig. 3 — (Left) North to south cross-section correlating Marginulina sands of Phoenix Lake field. Elevations approximately 20 ft.

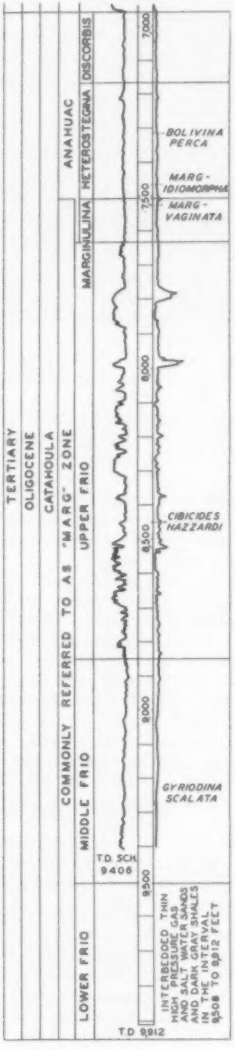


Fig. 4 — (Below) Type electric log showing Oligocene correlations for Phoenix Lake field.

velopment of the field, the operators have built a network of roads in the marsh, from which the wells can be drilled and serviced. To date, these roads have required a minimum amount of maintenance, considering the adverse conditions under which they are used. The roads have supported heavy hauling and traffic even under marsh and flood conditions. After considerable experimentation with various road-building materials and construction, it has been found that if sufficient time is allowed for the mud fill to dry and crust over before topping with a 9-in. wood mat covered with shell, the finished road offers remarkable resistance to the heavy traffic and adverse weather conditions to which they are subjected.

As of March 15, 1952, 28 wells have been drilled in this field since it was discovered, and there are 5 rigs running now. Twelve wells are completed as oil producers from the Brown "A" sand; eleven were completed as oil wells from the Brown "B" sand; and three dry holes have been drilled. One of the dry holes has been directionally redrilled and completed as a producer from Brown "A" sand, and the other two are presently being directionally redrilled.

First extension to field . . . Ohio Oil Co. spudded the 1-B Lutcher Moore well on May 18, 1951. This well was located out of the northeast corner of the Wortham-Higginbotham Survey in Orange County, Texas, approximately 5,700 ft. southwest of the nearest producer. The well was drilled to a total depth of 9,000 ft. and penetrated the upper Frio sands. Cores and tests in these sands indicated that only the Brown "B" sand was oil saturated, so the well was plugged back and completed in this sand between depths 7,983-87 ft. The well flowed initially at the rate of 284 bbl. of 40.8°-gravity oil per day through a 12/64-in. choke, with a gas-oil ratio of 715:1. Tubing pressure was 870 psi. and casing pressure was 1,375 psi.

Geology of Field

Structure . . . Phoenix Lake field is a faulted dome structure with axis slightly elongate northeast-southwest. The well-formed gravity minimum of the type that it is indicates to the writer that the structure resulted from salt movement at depth, and should be classified as a deep-seated dome. The area influenced by the growth of this structure can not be determined from the available subsurface data.

The structure on top of the Brown "B" sand seems simple enough within the area that has been drilled. It is a rather flat-topped dome with the east side cut by a fault dipping to the southeast. The fault, recognized in the records of most of the wells drilled on the east side of the field, has a hade of approximately 50°, and an apparent displacement of 260 ft. at a depth of 3,000 ft., decreasing to an average of 165 ft. at the level of the producing sands. The throw of the fault is also diminishing to the south, and may die out completely. These structural conditions are not unusual to this type structure in the Gulf Coast; however, it does seem unusual that additional faulting has not been seen in the logs of wells drilled to date, particularly since the seismograph pic-

THE AUTHOR

R. M. Wilson received B.S. degree from Louisiana State University in 1927. Early experience on graduation was in geophysics. He was assistant to the division geologist of Ohio Oil Co. and at present is division geologist of the Shreveport division of Ohio Oil Co.

"Phoenix Lake has two producing sands . . ."

tured the structure as a complex one typical of many of the deep-seated domes in the coastal area.

Producing sands . . . There are at present two producing sands in the field. The names Brown "A" and Brown "B" have been assigned these sands, since the discovery well in each sand was drilled on the Brown farm. Fig. 3 is a north to south electric log cross-section through the field, beginning with the 9 Brown well, and including 6, 5, 2, and 4 Brown, and 1 Lutcher-Moore wells. This section shows the correlation and stratigraphic relationship of the Brown "A" and Brown "B" sands. The Brown "A" sand occurs at an average depth of 7,770 ft., is 100 ft. thick, and has a proven productive closure of 50 ft. This neritic sand is usually light gray in color, quite unconsolidated, and ranges in texture from silty to medium grained. Varying amounts of shaly and silty sands have been observed from cores. Some of the more indurated parts of this sand are laminations of very fine to silty sands and dark gray shale. There are varying amounts of interbedded dark gray and greenish gray brittle and soft friable shale, occuring as thin discontinuous laminations and lentils. The oil in this sand is supported by water, and it is believed from the performance history of the reservoir that a very effective water drive is present. To date there is no evidence of a gas cap within the Brown "A" sand reservoir. The water-oil contact for the sand has been picked at a subsea depth of 7,768 ft. from core analyses and electric logs.

The Brown "B" sand occurs at an average depth of 7,970 ft. or 200 ft. below the top of the Brown "A" sand. The lithology of this sand is quite similar to the Brown "A" sand. It, too, is a fine to medium-grained gray sand containing varying amounts of light gray silty sand, greenish gray to dark shaly sand, and greenish gray to dark brittle and soft friable shale. The sand has an average thickness of 24 ft., contains gas, oil, and water, and has a proven productive closure of 67 ft. From core analyses and production tests the gas-oil contact has been picked at a subsea depth of 7,958 ft., and the water-oil contact at a subsea depth of 7,985 ft. This reservoir has a definite gas cap, and probably an effective water drive. Nine wells have been completed as oil producers from this sand.

Sands at these stratigraphic levels have been prolific producers of oil in many fields within the Oligocene and/or Frio trends of Louisiana and Texas.

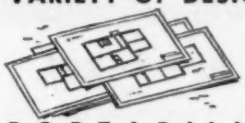
Stratigraphy

Any surface expression of structure in this field is completely covered and obscured by a mantle of black organic rocks and clays containing thin lentils of alluvial silts and very fine sands. The area is generally covered with water, and is subjected to very frequent flooding by the Sabine River.

Miocene and younger undifferentiated . . . Under this mantle of clay are 800 to 1,000 ft. of fine to coarse-grained unconsolidated water sands and gravels. Chunks of excellently preserved cypress logs and stumps have been recovered from the drilling-mud stream as this interval was drilled. The maximum depth at which this wood has been encountered is not certain; however, the drillers believe that from time drilling and the manner in which the bit runs as it penetrates this section, these buried logs and stumps have been encountered to depths of 900 ft. below the surface. The section from 1,000 to 6,900 ft. consists of massive fine to medium-grained, light gray and unconsolidated sands, interbedded with

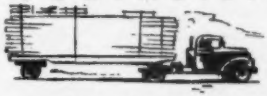
GET THESE EXTRAS IN
STURDYBILT
PREFABRICATED HOUSES

VARIETY OF DESIGNS . . .



Choose from a large selection of homes, garages, warehouses and other buildings. Get what you want in STURDYBILT.

PORTABILITY . . .



Complete housing sections moved anywhere a truck can go. Buildings erected on your site in days instead of weeks.

DEMOUNTABILITY . . .

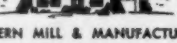
Move your STURDYBILT houses when you abandon an old site. They can be erected on new location with practically no loss of material.

ONE SOURCE . . .

One purchase order takes care of designing, transporting and erecting. Truly one stop buying when you get STURDYBILT Prefabricated Houses.

MANUFACTURERS OF SPECIAL MILLWORK; DISTRIBUTORS OF JOHNS-MANVILLE BUILDING MATERIALS; CURTIS WOODWORK

STURDYBILT PREFABRICATED, DEMOUNTABLE HOUSES



SOUTHERN MILL & MANUFACTURING CO. • TULSA, OKLAHOMA

STURDYBILT HOUSES COMPLY WITH COMMERCIAL STANDARD CS125 OF THE NATIONAL BUREAU OF STANDARDS FOR PREFABRICATED HOMES

Phoenix Lake. "Formational and zone boundaries . . ."

green and grayish green, soft friable to firm shale. The rapid facies changes and the absence of fauna in these sands and shales precludes a definite lithologic or paleontological geological age zonation of these rocks.

Discorbis zone (Oligocene) . . . To facilitate correlations for structural interpretations, the writer has chosen to pick formational and zone boundaries within the Oligocene series on lithologic breaks. These boundaries in most cases are very close to the first occurrence of fauna characteristic to the formation. The *Discorbis* zone is approximately 200 ft. thick in this field and occupies the interval between depths 6,950 to 7,165 ft. on the type log. This zone is marine and is composed of dark greenish gray, firm to brittle shale with occasional very thin silty shale streaks. Fauna characteristic to the *Discorbis* zone were noted in the massive sands approximately 150 ft. above the zone as picked.

Heterostegina zone (Oligocene) . . . This zone is approximately 350 ft. thick and occurs at a depth of 7,165 ft. on the type log. It consists primarily of dark greenish gray shales similar to the *Discorbis* shales above. The top of this zone is calcareous and only slightly limy. The lithologic break from samples is not diagnostic, but the calcareous shales do contain fauna characteristic to the *Heterostegina zone*.

Marginulina zone (Oligocene) . . . This zone is 130 ft. thick and occurs at a depth of 7,510 ft. on Fig. 4. It consists of shales identical to the shales above, and was identified by the occurrence of *Marginulina idiomorpha* and *Marginulina vaginata*.

Upper Frio (Oligocene) . . . This zone is 1,215 ft. thick, and commences at a depth of 7,630 ft. on the type log. The Brown "A" and "B" producing sands are in the upper 350 ft. of this zone. The upper Frio in this field is predominantly a fine to medium-grained, generally clean greenish gray to gray massive porous sand section, with occasional indurated siltstone lenses interbedded in the sand. The shales in this zone are darker than those in the Anahuac group above. They are generally firm to brittle and range in color from greenish gray to dark gray and black.

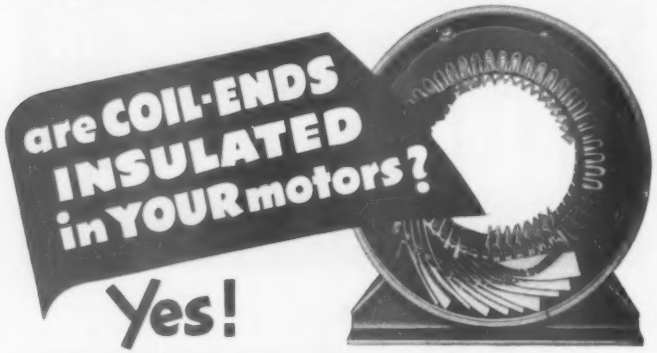
Middle Frio (Oligocene) . . . This zone is about 650 ft. thick and commences at a depth of 8,845 ft. on the type log. It is characteristically a marine shale section. The shales are similar to those of the upper Frio, but are generally much darker in color. Only one well has penetrated this section in the field, so the detail of lithology, and complete fauna associated therewith is relatively unknown.

Lower Frio (Oligocene) . . . This zone has not been penetrated to date in this field, so its true thickness is unknown. The interval from 9,508 to 9,912 ft., the deepest depth reached in the field, is considered by the writer to represent the upper, and part of the middle lower Frio. The zone consists of thin to very thin, light gray sands, interbedded in dark gray to black shale. Some of these sands were saturated with gas and salt water at extremely high pressures. Considerable difficulty was experienced in drilling this zone, and consequently a very poor record of these rocks was obtainable.

Reservoir Data

Detail reservoir information has been collected on this field for engineering and completion studies. The following are average data for each reservoir:

The productive sands in most of the wells were cored and analyzed. Permeability for the Brown "A" sand ranges upward to 9,600 md. and averages 2,300 md. The average porosity is 32



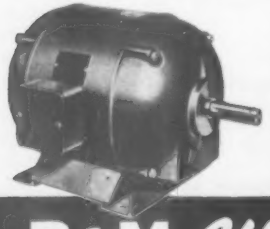
if they're ROBBINS & MYERS!

Only Robbins & Myers insulates motors *between* the winding coil-ends —another good reason why R & M motors run so long without trouble or maintenance. Yet this added protection and many other fine features are yours at the *standard-motor* price.

See how R & M insulation isolates every coil-end. It's not merely used to separate phase groups, as in *other* motors. This gives you from three to four times more insulation to guard against deterioration and weak spots. And the whole job is done with *craftsmanship* care and the very finest materials.

Inside and out, these exceptional motors are built for dependable service. You'll find them working on *job after job* in all the major oil fields.

Write for free Bulletin 3019-C.



WHY YOU GET *PLUS* PERFORMANCE

Yes, R & M motors have what you need for out-of-sight, out-of-mind uses: (1) shrouded end-heads that give open motors full-height end-protection; (2) screened openings which prevent entry of rodents, snakes, and debris; (3) "Clean Sweep" end-to-end ventilation to keep everything clean and cool-running; (4) the largest-of-all pre-lubricated, fully sealed ball bearings; no attention needed for years; (5) "Weatherizing" which shields every part from costly damage by moisture. All sizes and types for oil-country preferences and purposes.

R&M *All-Weather Oil Country* MOTORS

ROBBINS & MYERS, INC., Motor Div., SPRINGFIELD 99, OHIO • BRANTFORD, ONT.

wherever
petroleum
moves
Chas. Martin
inspectors
are on
the job

New York, N. Y.
Boston, Mass.
Fall River, Mass.
Providence, R. I.
Tiverton, R. I.
Chicago, Ill.
Philadelphia, Pa.
Marcus Hook, Pa.
Paulsboro, N. J.
Bayonne, N. J.
Elizabeth, N. J.
Baltimore, Md.
New Orleans, La.
Goodhope, La.
Baton Rouge, La.
Lake Charles, La.
Port Arthur, Texas
Beaumont, Texas
Houston, Texas
Baytown, Texas

Texas City, Texas
Freeport, Texas
Corpus Christi, Texas
Brownsville, Texas
Helena, Ark.
Arkansas City, Ark.
Ras Tanura, Saudi Arabia

Sidon, Lebanon
San Pedro, Calif.
San Luis Obispo, Calif.
San Francisco, Calif.
Seattle, Wash.
Tampico, Mexico
Havana, Cuba

Aruba & Curacao, N. W. I.
Trinidad, B. W. I.
Caripito, Puerto La Cruz
Las Piedras, Venezuela
Caracas, Venezuela
Amuay Bay, Venezuela
Punta Carden, Venezuela

Chas. MARTIN & Company

INSPECTORS OF PETROLEUM

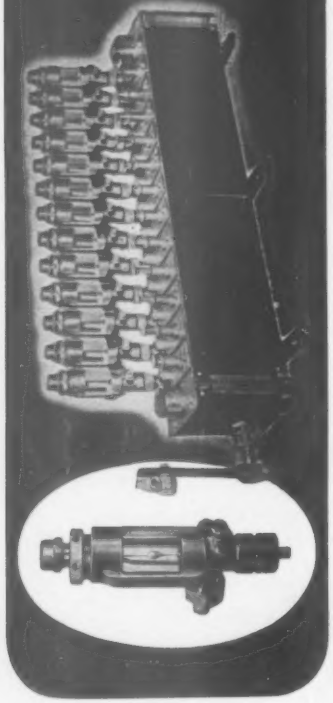
World's First Petroleum Inspectors

new McCORD Tubular "Clearsite" Feed SF LUBRICATOR

The new McCord "SF" Lubricator delivers a predetermined quantity of oil under pressure at regular intervals to cylinders or bearings. A new improved tubular clearsight feed, a McCord development, shows delivery and quantity of oil. It may be viewed without removing from pump. Other

McCord advantages are easy removal of pump units, welded steel tanks, wide variety of drives, and a new graduated oil level gauge providing greater visibility. McCord offers you an outstanding lubricator, further improved to provide better service. Deliveries are prompt.

LUBRICATOR DIVISION
McCORD CORPORATION • Detroit 11, Mich.



Phoenix Lake. "Productivity indexes 1 to 30 . . ."

per cent and the average calculated connate water is 35 per cent. The average effective Brown "A" sand thickness is 28 ft. Wells completed in this reservoir produce initially at rates varying between 292 to 864 bbl. of 48°-gravity oil per day through chokes ranging in sizes from 11/64-in. to ¼-in. The gas-oil ratios on initial tests average 800:1; the tubing pressure averages 1,375 psi.; and casing pressure 1,425 psi.

An original bottom-hole pressure of 3,527 psi. was measured in this reservoir. Subsequent periodic pressure surveys have shown no pressure decline. Productivity indexes have been computed for many of the wells and were found to range from 1 to 30. The following results were determined from an analysis of a reservoir fluid sample taken from the Brown "A" sand. The measured bubble-point pressure of the reservoir oil is 3,497 psi., indicating that the oil is essentially fully saturated at original reservoir temperature and pressure.

During differential vaporization 1 bbl. of original reservoir saturated oil shrank to 0.644 bbl. at 60° F., or in other words, the formation volume factor is 1.55. The viscosity of the oil was found to increase from 0.34 cp. at original reservoir conditions to 1.28 cp. at atmospheric conditions. The solution gas-oil ratio in the reservoir is 1,035 cu. ft. per barrel of stock-tank oil.

The Brown "B" sand is not quite as clean as the Brown "A" sand. Permeability upward to 5,590 md. were measured from analysis of cores in this sand. The average permeability, porosity, and effective thickness for this sand were 719 md., 30.9 per cent, and 15.4 ft., respectively. The connate water was calculated to be 25.6 per cent.

Wells completed in this sand produce on initial test at rates between 97 to 294 bbl. of 43°-gravity oil per day, through chokes varying in size between 10/64 and ¼-in. Flowing tubing pressures range between 870 and 2,200 psi., and casing pressures between 1,375 and 2,480 psi. An original bottom-hole pressure of 3,620 psi. was measured in this reservoir. Subsequent bottom-hole-pressure surveys have shown no decline. Productivity indexes of 3 have been calculated for some of the wells completed from this reservoir. A bottom-hole-fluid sample has not been taken from this sand. It is believed that the fluid characteristics in the Brown "A" and "B" sands are similar. Reservoir studies of the Brown "A" and "B" sands indicate that each has an effective water drive.

Two-State Field

Extension of this field into Texas adds many more problems to the development program. One of the most important of these, of course, will be to coordinate the conservation laws for Louisiana and Texas so that the reservoirs in each state can be developed and drained equitably. This problem will become a most complex one as the field grows to include smaller and smaller tracts of land, and finally, the town lots in the city of Orange. It may be anticipated that more difficult directional drilling will be necessary to drain the area beneath the Sabine River, because of its tight meanders and the wide area that it covers as it traverses the field. Other water bodies in the area, as some already have, will present new and difficult problems for locating and drilling wells. The close proximity of this field to the highly industrialized part of the city of Orange adjacent to the Sabine River and the permanent Naval installation, etc., no doubt will necessitate considerable thought for planning operations in this field. It may be necessary before this field is finally drilled up, to employ ideas uncommon to a normal development program. Considerable directional drilling has been done in the field to date.

Directional drilling . . . At present there is a drilling operation in progress that is unusual in that the hole is started in Texas, drills under a portion of Louisiana, and finally will be bottomed in Texas. Ohio Oil 2 Texas State lease 36027 is drilling from a surface location on the Texas Creosote Co. property in the northwest part of the Archibald Richey Survey of Orange County, Texas. As can be seen from the map the Sabine River meanders very sharply to the northwest, north of the surface location, enclosing a portion of Louisiana, being fractional Sections 19 and 30.

State regulations make it advisable to start and complete such a well in the same state. This hole, to satisfy conditions set out in the lease to the State of Texas, must be bottomed at a point approximately N 42°, 17 ft. W, 1,487 ft. out of the southeast corner of Section 19, or when the job is completed the hole will be deflected N 13°, 9 ft. E, 2,532 ft. from the surface location. To do this the hole passes out of Texas, under that portion of Louisiana included within the meander of the Sabine River, then into Texas again where it is bottomed in the Texas half

There's A RIGHT WAY To Get A RIGHT OF WAY RIGHT AWAY!

Plan the best route, have all ownership information, right in your own office!

In a very short time, averaging two days, you can get a Tobin Photographic Map of your route, showing the most accessible path, all impediments, and every ground feature, plus a Tobin Ownership Map which overlays the Photographic Map and lists all property owners, their addresses, and the tract information.

IT'S THE QUICK, LOW-COST TOBIN WAY!

Savings in time, labor, and money mean profit to men who construct pipelines, transmission lines and communication lines, and each day more and more such companies, large and small, are enjoying the savings Tobin service brings. Tobin Aerial Surveys have more than 500,000 square miles of the United States *already* photographed, correctly correlated, and mapped, and this huge library is available at no cost to companies using the Tobin Right-Of-Way maps, to help them first pick the most desirable route before requesting strip photograph maps and ownership overlays. These are all reasons why the Tobin way is the right way to get a right-of-way right away! Remember also, that when you deal with Tobin you save on right-of-way purchase costs too, because the secrecy of your preliminary operations is preserved! Try Tobin Aerial Surveys on your next right-of-way job!

PHOTOGRAPHIC STRIP MAP, PLUS OWNERSHIP OVERLAY FROM EXISTING FILES, COSTS ONLY $27. PER RUNNING MILE!

EDGAR TOBIN AERIAL SURVEYS

502 West Mistletoe — San Antonio, Texas

"How to drill and complete, Phoenix Lake . . ."

of the Sabine River. The drilling operation was designed so that the maximum angle of deflection would be reached in the first 1,600 ft. of hole drilled. The whipstocked hole was cased off with 1,600 ft. of pipe, and when drilling was resumed under surface casing the drill bit was directed on a straight line to the target. Casing has subsequently been set to a depth of 5,514 ft., and at this time the well is drilling ahead as planned.

Field Rules

Application for field rules and spacing has not been made to the commissioner of conservation of the State of Louisiana, nor has he on his own volition ruled on these questions for that part of the Phoenix Lake field located in Louisiana. This portion of the field is being developed on a 40-acre per well spacing pattern, with the well in most cases being located in the center of a governmental 40-acre tract. Continuous development on the same lease under the 40-acre per well pattern since the field was discovered has not necessitated fixing field rules and spacing. At present, the per well allowable is set at 214 bbl. of oil per day for the Brown "A" and/or Brown "B" sand wells.

Field rules for the Brown "B" sand reservoir have been fixed by the Railroad Commission of Texas for the Texas side of this field. The present allowable for these wells is also 214 bbl. per day if drilled on a 40-acre well unit or tract. The rules provide further that the per well allowable is proportional 50 per cent to the well and 50 per cent to acreage when drilled on a tract containing less than 40 acres.

Drilling and Completion Practices

Drilling in this field has been done with contract rigs. A 27-in. hole is drilled to a depth of 250 ft., and 200 ft. of 20-in. conductor pipe is set therein and cemented to surface. A 1,600-ft. string of 13⅜-in. conductor pipe is set and cemented to surface in an 18-in. hole. A 9⅞-in. hole is then drilled to a depth of 50 ft. below the base of the Brown "B" sand, and 7-in. production casing is set and cemented therein.

To prevent loss of circulation while drilling hole for the conductor pipe, the mud is jetted out of the hole to minimize hydrostatic head thereon. The producing sands are generally block-squeezed with cement. These block-squeeze jobs are done through four ½-in. gun perforations within a 1-ft. interval. About 5 ft. of the casing is usually jet perforated opposite the sand between the block squeeze jobs for production, and 2½-in. tubing is suspended from the normal well head connections. The mud in the casing is displaced with clear water, and usually the well comes in under its own power. Most of the wells are produced through 10/64-in. tubing chokes.

Production

Cumulative production through December 31, 1951, from the Brown "A" reservoir is 670,079 bbl.; and from the Brown "B" reservoir, 138,375 bbl., or a total for the field of 808,454 bbl. The cumulative gas production through December 31, 1951, from the Brown "A" sand is 616,882 M.c.f.; and from the Brown "B" sand, 518,000 M.c.f., or a total of 1,134,882 M.c.f. for the field.

ACKNOWLEDGMENT

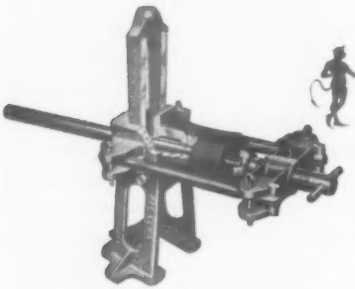
The writer is indebted to the management of Ohio Oil Co. for permission to write and publish this paper, to the personnel of the geological and other departments of this company for their willing cooperation in supplying data used in this paper, and their candid criticism.

RED DEVIL

"DIA-HARD" PISTON RODS

For high pressure abrasive service

RED DEVIL Piston Rods are first choice where drilling conditions are severest because of the extreme hardness of the deep HIGH-CARBON wear resistant "DIA-HARD" case, coupled with tough core properties which give the highest tensile strength against breakage. All rods are hardness tested and precision gauged to maintain a world-wide reputation for quality. Write for Catalog No. P-101.



RED DEVIL PISTON PULLER

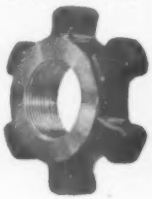
For tapered type rods

The usual practice of removing pistons from rods by blows of a sledge hammer often damages either pistons or rods. A Red Devil piston puller easily and quickly removes badly stuck pistons without injury to either part. All elements are made of finest quality alloy steel, heat-treated for strength and long life. Write for Catalog No. P-106.

RED DEVIL PISTON ROD LOCK NUT

These "Hammer Lug Type" nuts provide a fast and positive means for locking piston rod in crosshead. Made from alloy steel and heat treated, they will last indefinitely. Face of nut is precision machined for full seating surface at right angles to axis of threads to prevent fatigue stresses in rod. Write for Catalog P-102.

Complete information in Composite Catalog or write for price catalogs noted above. Red Devil products are available through your supply store.



OIL WELL MANUFACTURING CORP.

6002 South Alameda St., Los Angeles 1, California

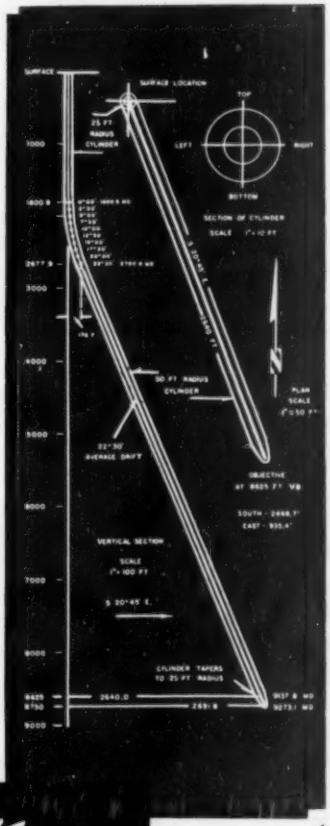
Specialized Engineering Services...

Eastman will assist you in planning your drilling program.

Available on Directional Drilling Projects.

Eastman is highly qualified to give the oil field operator specialized engineering and consultation service on his CONTROLLED DIRECTIONAL DRILLING PROBLEMS in every major oil field throughout the world. Eastman's Engineering, research, and experimental departments have had many years of experience in the fields of Controlled Directional Drilling and Oil Well Surveying. These Engineers will make planned proposals, plot survey records, estimate costs, design special tools, or compile specific data and records on Directional Drilling work wherever possible, as desired by the operator. These services save expensive changes and alterations in his plans later on.

Directional Drilling Proposal



Call an Eastman Engineer; He's ready to serve you ... TODAY!

Eastman
OIL WELL SURVEY COMPANY
LONG BEACH • DENVER • HOUSTON

Export Sales & Service: EASTMAN INTERNATIONAL COMPANY • P.O. Box 1500 • Denver, Colorado • U.S.A.

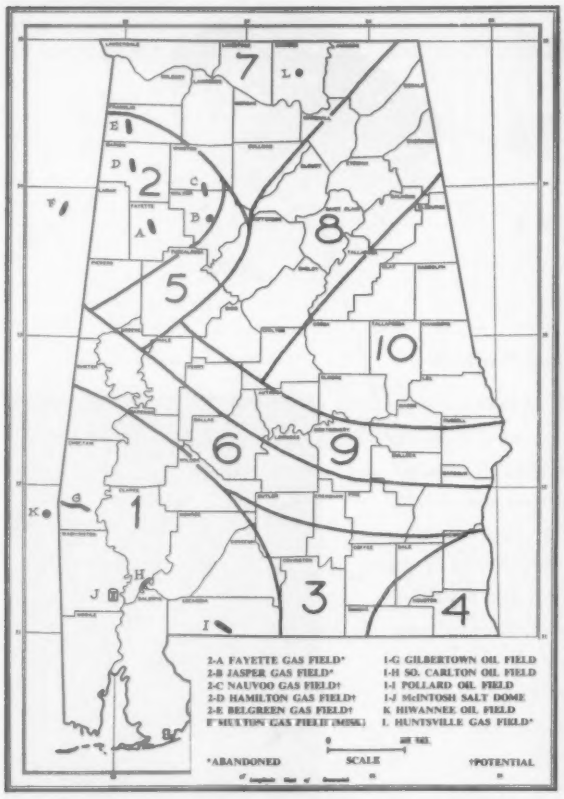


Fig. 1—Map showing the 10 provinces of Alabama that are used for brief descriptions of the geology of the state. This map also keys the oil and gas fields that are discussed.

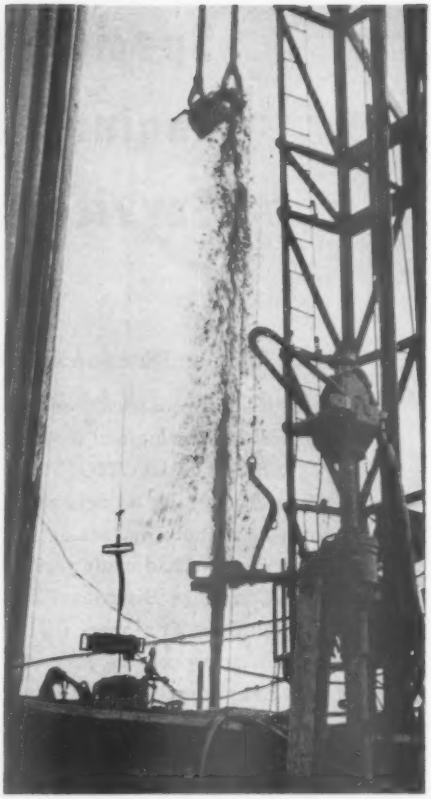


Fig. 2—Humble Oil & Refining Co. 1 Moye, discovery well of Pollard field, Escambia County, Alabama. (Published by permission of Associated Press.)

Alabama's Geology . . . and Summary of State's Oil and Gas Development

A brief account of the search for oil and gas in Alabama during the 87-year period since the two Watson wells were drilled in 1865.

by Walter B. Jones

RECENT discoveries coupled with the fact that three-fifths of the state is favorable to prospecting for oil and gas indicate that Alabama should become a major producing state in the not-too-distant future. Additional discoveries of oil and gas fields are confidently expected this year.

Though the first test for oil in Alabama was drilled in 1865 it was not until 1944 that the first producer was completed—this was the 351st well to be drilled in the state. Since then three oil fields have been discovered in which there are 81 producing wells. Drilling is continuing in each field, with development in two of the fields just getting started.

Geology

For the sake of clarity the state has been divided into 10 provinces (see map) in relative order of importance for prospecting for oil and gas. A brief description of each province is as follows:

1. Southeast Alabama . . . Comprising

"Welding 8" line preparatory to shoving across a South Louisiana marsh"

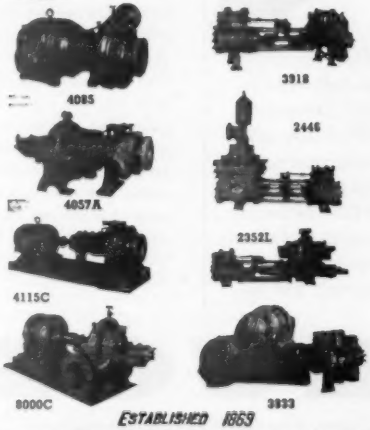
HOUSTON CONTRACTING COMPANY
General Contractors
OIL • GAS • GASOLINE • WATER PIPE LINES
LAURENCE H. FAVROT R. P. GREGORY GEO. A. PETERKIN
2707 FERNDALE PLACE HOUSTON 6, TEXAS

DEAN BROTHERS PUMPS INC. INDIANAPOLIS INDIANA PUMPING MACHINERY

PUMPS

CENTRIFUGAL
RECIPROCATING

BUILDERS OF OUTSTANDING PUMPS
Since 1869



ESTABLISHED 1869

DEAN BROTHERS PUMPS INC.

INDIANAPOLIS IND.

323 W. TENTH ST.

RAMSCO

FREE TURNING

BALL BEARING SWIVEL FITTINGS

FOR LIQUIDS, GASES, STEAM, AND OTHER CHEMICALS. HOT OR COLD SERVICE. CONTINUOUS OR OCCASIONAL ROTATION SERVICE.

360° FREE ROTATION—1, 2 AND 3 PLANES

Your particular piping problems solved. You name it—we have it. Over 500 sizes, types, styles. Sizes: ⅜" to 14" low pressure; ¾" to 6" high pressure. Corrosive service or steam fittings 1000 psi. and temp. to 750°F., asbestos or Teflon packed. Low pressure fitting to 1000 psi. and temp. to 225° F. High pressure fittings to 15,000 psi. and temp. to 225° F. Gear driven types available.

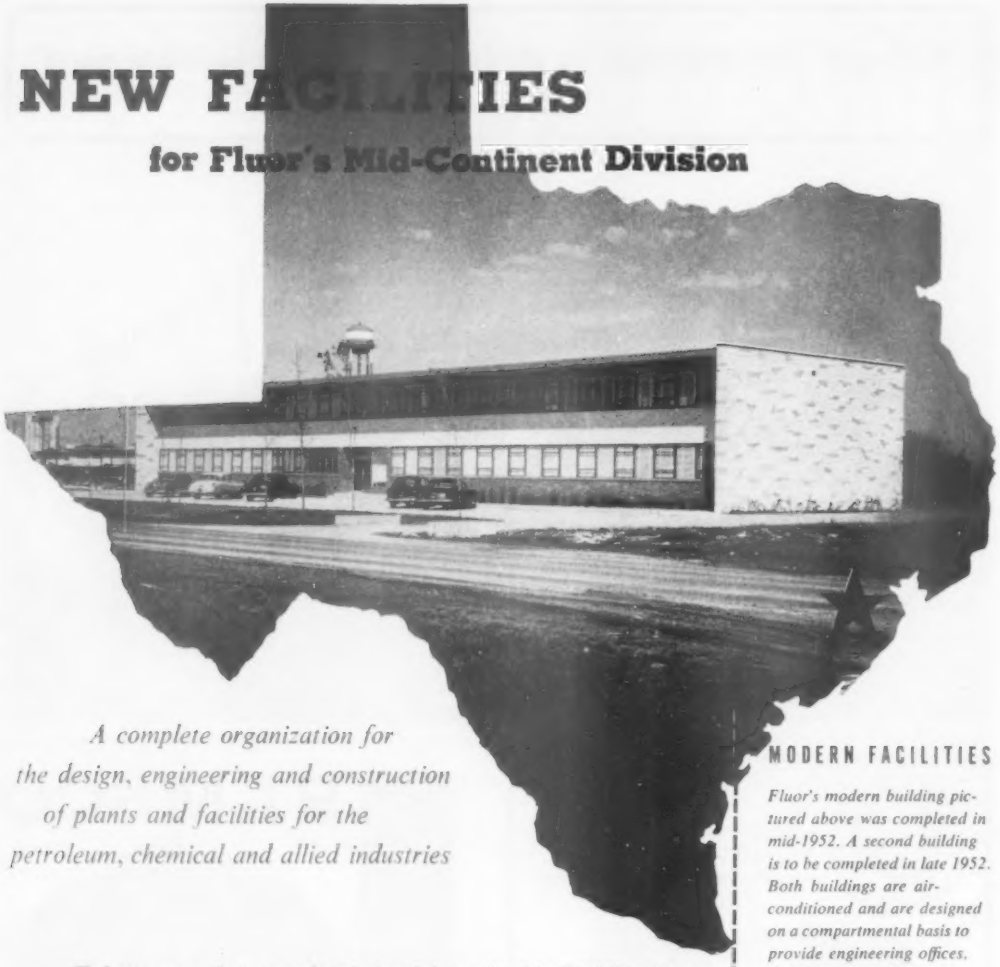
Send for complete catalog and prices. State kind of service, pressure, temperature, pipe size and indicate style at left, threaded, flanged or weld ends.

RASMUSSEN MFG. CO.
12305 INDUSTRIAL AVENUE
HOLLYDALE, CALIFORNIA

RAMSCO

NEW FACILITIES

for Fluor's Mid-Continent Division



A complete organization for the design, engineering and construction of plants and facilities for the petroleum, chemical and allied industries

To better serve the tremendous industrial growth of the Mid-Continent and Gulf Coast areas, Fluor's Mid-Continent Engineering Division has recently moved into new and permanent headquarters in Houston, Texas. These new and completely modern facilities are designed specifically for the efficient and expeditious handling of a large variety of engineering and construction services for the petroleum, natural gas, chemical and allied industries.

In addition to these on-the-spot services offered by the Mid-Continent Engineering Division, other important advantages and considerations include: strategically located storage and maintenance facilities for construction tools and equipment at Paola, Kansas; recourse to the broad engineering and research talents of the *entire* Fluor organization; and, the financial security and buying power of a major company—one with national recognition and over a half century of experience.

MODERN FACILITIES

Fluor's modern building pictured above was completed in mid-1952. A second building is to be completed in late 1952. Both buildings are air-conditioned and are designed on a compartmental basis to provide engineering offices, drafting rooms, blueprint rooms, supply and storage areas, and offices for accounting, purchasing and administrative personnel. Each building contains 15,000 square feet of floor space—a total of 30,000 square feet devoted exclusively to the work of Fluor's Mid-Continent Engineering Division.

FLUOR

Engineers - Constructors - Manufacturers

THE FLUOR CORPORATION, LTD. · LOS ANGELES · HOUSTON
New York, Chicago, Pittsburgh, Boston, Tulsa, San Francisco, Birmingham and Calgary

Represented in the Sterling areas by:
Head Wrightson Processes Ltd., Teesdale House, Baltic Street, London, E.C.1, England

The author, this article on Alabama's geology . . .

Walter B. Jones has been state geologist for Alabama since 1927. Jones, who is also state oil and gas supervisor, received his A.B. and M.A. degrees from the University of Alabama, and his Ph.D. from Johns Hopkins University. During 1949 he served as president of the Association of American State Geologists. Jones served in both World Wars and is a reserve officer, Corps of Engineers, with rank of colonel. Jones is shown here dabbling in waste oil from Humble Oil & Refining Co. 1 Moye, Pollard field.

about one-seventh of the area of the state, this province contains three oil fields, all the state has at present. Outcropping at the surface are beds of Eocene to Recent age. Prominent features are the Hatchetigbee anticline in southern Choctaw County and the Jackson fault in southwestern Clarke County, both surrounded by a deep salt basin. Along the inner margin the embayment encountered steep shore lines along outcrops of Paleozoic rocks to the westward and possible crystalline rocks at the eastern terminus.

Subsurface beds include Lower Cretaceous, Smackover, Eagle Mills, and others not shown at all on the outcrops. A shallow salt dome was discovered recently (see J on map). Others may be expected. The state's deepest well, 15,659 ft., was drilled in Washington County. It bottomed in the Jurassic, just above the Smackover. Surface geology, geophysical prospecting, and core drilling have combined to outline a goodly number of interesting and intriguing structures, particularly in Clarke, Monroe, and Escambia counties. Most of these are yet to be tested.

2. Warrior coal basin . . . Outcropping at the surface in this province are the shales, sands, and conglomerates of the coal measures, of Pennsylvanian age, with a blanket of clay. Sand and gravel of Upper Cretaceous age cover the western part. Beneath the coal measures lie Paleozoic formations in more or less normal succession. Many structures are known in the area, mostly parallel or perpenticular to the trend of the Appalachian uplift. Exceptions are domes. Practically every well drilled in this province had shows of oil or gas or both. Two abandoned and three potential gas fields are located in the area. There are plenty of possible horizons and under sufficient cover.

3. South-central province . . . Surface geology in this area is similar to that in Southwest Alabama. It was once thought that a continental barrier extended beneath this area but evidence based on a few deep wells suggests that subsurface geology also may be quite similar to the southwest province. Ultimately, as the drilling program progresses, this area may be placed in Provinces 1 and 4. Not too much is known about structures in the area, but they should exist.

4. Southeast Alabama . . . Here again is surface geology similar to that of Provinces 1 and 3. While an insufficient number of wells has been drilled there to accurately assess subsurface conditions and values, it is believed that the area is a shallow salt basin.

"Most Foolproof... Simplest and Most Efficient Cathead"
—says "SLICK" BASS
WICHITA
Air-Tube
CATHEAD
SAFEST
FREEST RUNNING
MAKES UP ALL JOINTS ALIKE
"The two most important advantages of Wichita Catheads are: First, ability to make each joint to the same degree of tightness, and second, the dependability of the Air-Tube Clutch which the Cathead is built around. With complete confidence we recommend Wichita Catheads as SIMPLE and FOOLPROOF in OPERATION, and MOST EFFICIENT we have ever used."
ROBT. M. "SLICK" BASS
Oil Well Drilling
Kilgore, Texas
For complete Literature write:
WICHITA FALLS FOUNDRY & MACHINE CO., INC.
WICHITA FALLS, TEXAS
ANOTHER OUTSTANDING
WICHITA
PRODUCT

Table shows Alabama's drilling history . . .

The most important known structure in the region is the Columbia-Gordon anticline near the Chattahoochee River in Houston County. It is believed that this area has distinct oil and gas possibilities.

5. Inner Warrior coal basin . . . Similar to Province 1, this zone is separated from it for the reason that the sharply folded Sequatchie Valley anticline, which plunges southwestward under this area, is untested and therefore unknown. In Blount, Marshall, and Jackson counties the anticline is narrow and heavily faulted. If faulting diminishes under cover, as is expected, then chances for oil and gas are excellent. If drilling proves otherwise, then part of this province will be included in 8.

6. Steep shore line . . . Once thought to have only 2,000 to 3,000 ft. of Tertiary and Cretaceous beds covering Paleozoic and crystalline rocks, this province was not too highly regarded. Two wells along the southern fringe of the belt, in Wilcox County, and one now drilling in Butler County, suggest that the shore line was steep, permitting a thickness of 6,000 to perhaps 10,000 ft. of sedimentary beds on top of basal rocks. In the Smackover section is a beautiful sand some 250 to 350 ft. thick. It should be productive somewhere in the area. Sand lens pools are possible also.

7. Tennessee Valley . . . Outcropping in this province are Silurian and Mississippian beds in the northern part, and coal measures in the southern part. A number of structures, both anticlines and domes, are known. Others could be found by surface geology and core drilling. Beds are essentially flat. Areas similar to this one produce oil in Tennessee and Kentucky and should be productive here. Wells of 3,000 ft.

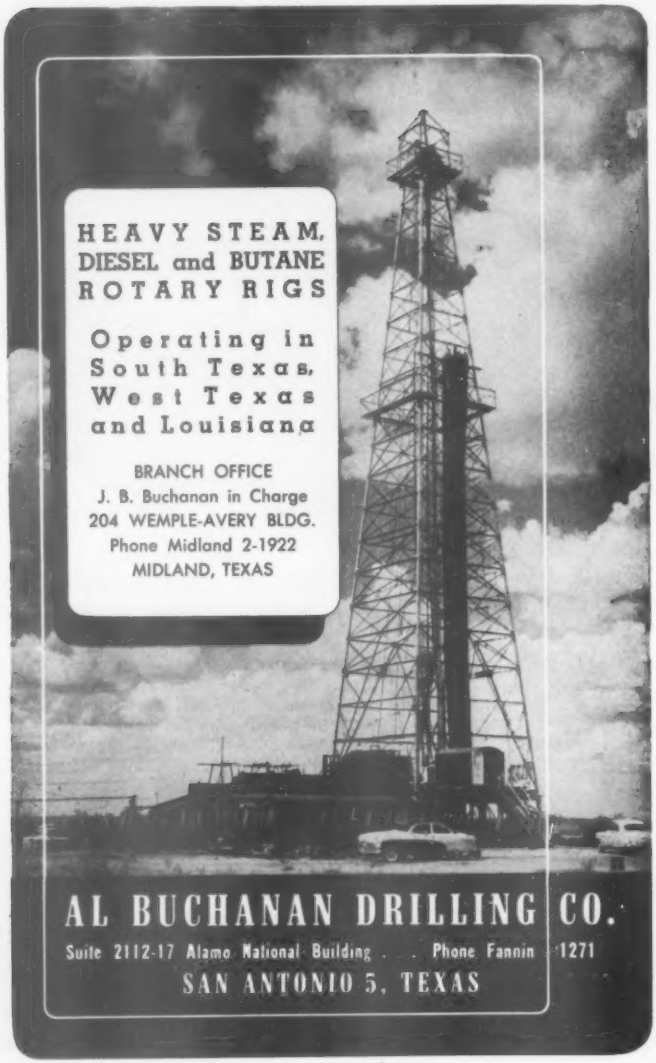

HEAVY STEAM, DIESEL and BUTANE ROTARY RIGS
Operating in South Texas, West Texas and Louisiana
BRANCH OFFICE
J. B. Buchanan in Charge
204 WEMPLE-AVERY BLDG.
Phone Midland 2-1922
MIDLAND, TEXAS
AL BUCHANAN DRILLING CO.
Suite 2112-17 Alamo National Building . . Phone Fannin 1271
SAN ANTONIO 5, TEXAS

TABLE 1—WELLS DRILLED IN ALABAMA BY DEPTH AND BY PERIODS

South Alabama

Depth (ft.)	No. wells
0- 1,000	11
1,001- 2,000	30
2,001- 3,000	34
3,001- 4,000	113
4,001- 5,000	35
5,001- 6,000	50
6,001- 8,000	48
8,001-10,000	19
10,001-12,000	6
12,001-14,000	2
14,001-16,000	2
Unknown	7
Total South Alabama	357

Period	No. wells
1865-1899	2
1900-1919	35
1920-1939	54
1940-1949	161
1950 to date	105
Unknown	0
Now drilling	29
Total South Alabama	386

North Alabama

Depth (ft.)	No. wells
0- 500	55
501- 1,000	29
1,001- 1,500	38
1,501- 2,000	53
2,001- 2,500	28
2,501- 3,000	13
3,001- 4,000	16
4,001- 5,000	7
5,001- 6,000	2
Unknown	31
Total North Alabama	272
Total Alabama	629

Period	No. wells
1865-1899	27
1900-1919	121
1920-1939	26
1940-1949	60
1950 to date	10
Unknown	28
Now drilling	5
Total North Alabama	277
Total Alabama	*663

*Includes 34 wells now drilling.

in the north and 6,500 ft. in the south should cut most of the possible oil and gas-bearing horizons. Such projects are not unduly expensive and should appeal to the smaller investor.

8. Folded Paleozoics . . . Characterizing the geology of this area are geoanticlines and synclines, more or less sharply faulted. One fault in Jefferson County has a displacement of about 13,000 ft. In the anticlinal valleys, beds of Cambro-Ordovician age outcrop. On top of the synclinal mountains, the basal part of the coal measures (lower Pottsville) outcrops with Mississippian limestones, shales, and cherts along the slopes. Along the eastern side there are slates, marbles, quartzites, etc., mostly of Cambrian age. It is not thought that the area offers much opportunity for oil and gas.

9. Gentle shore line . . . While only a few wells have been drilled in this area, what evidence there is points to a shallow cover of Upper Cretaceous sediments on top of basal rocks. In the future, there may be some juggling of the line between 9 and 6. As now drawn, it is the best thought according to data at hand. Chances for oil and gas in this province are slim.

10. Crystallines . . . In this province are schists, granites, and other igneous and metamorphic rocks of the old Piedmont Plateau. It is regarded as impossible for oil or gas.

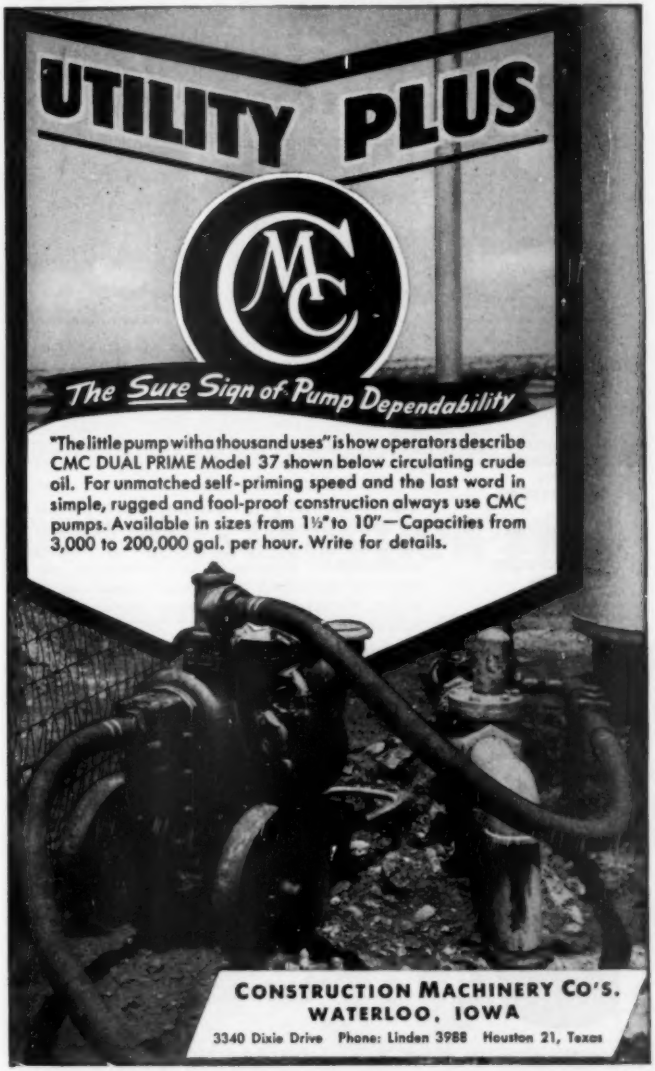
From Table 1 it is obvious that a great many wells in both divisions were too shallow to be conclusive. Most of the very shallow wells (0-500 ft.) were drilled near oil springs, or in Huntsville gas field. It will be noted that North Alabama received early attention, and that interest has been lagging since 1920. It should pick up now. On the other hand, South Alabama has been booming since 1940, mostly since the discovery well in Gilbertown field in 1944. Note that 29 permits are outstanding in this division, compared to only 5 in North Alabama.

Paleozoic Area Fields

A. Fayette gas field (abandoned) . . . In 1909, while drilling a core hole for coal near Fayette, a slight show of oil was encountered at 475 ft. A flurry of drilling followed and some 46 wells were drilled before the project was abandoned in 1917. The best among nine gas wells had a capacity of 4,500,000 cu. ft. daily, with a shut-in pressure of 650 psi. Others ranged from 1 to 4 million. Shows of oil and/or gas were reported in all wells drilled. A pipe line to Tuscaloosa was considered in 1912, but never materialized. Shortly afterward, the wells began to decline, probably due to the fact that little casing was used and that set on shoes or packers which soon permitted invasion of water into the gas sands.

The structure is an anticline with northwest-southeast axis. The producing horizon was the lower Pottsville (Fayette) sand, of Pennsylvanian age. Average depth of the sand was about 1,400 ft. The writer visited one of the old wells in 1927, and drew from it a couple of gallons of heavy black oil that was floating on the top of water some 20 ft. below the surface. Its source is unknown. Deep tests in the area might be highly successful.

B. Jasper gas field (abandoned) . . . Inspired by the activity at Fayette, a series of wells was drilled near Jasper in Walker County, in 1911-12, and gas was encountered in three of them at about 1,800 ft. in the Hartselle sandstone, of Mississippian age. When

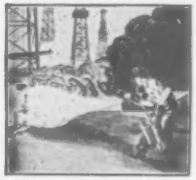

UTILITY PLUS
CMC
The Sure Sign of Pump Dependability
"The little pump with a thousand uses" is how operators describe CMC DUAL PRIME Model 37 shown below circulating crude oil. For unmatched self-priming speed and the last word in simple, rugged and fool-proof construction always use CMC pumps. Available in sizes from 1½" to 10"—Capacities from 3,000 to 200,000 gal. per hour. Write for details.
CONSTRUCTION MACHINERY CO'S.
WATERLOO, IOWA
3340 Dixie Drive Phone: Linden 3988 Houston 21, Texas

FOR SKILLED PERFORMANCE BY UNSKILLED OPERATORS

INDOORS and OUTDOORS YOUR *BEST* PROTECTION FOR FLAMMABLE LIQUID, GAS AND ELECTRICAL FIRES

ANSUL DRY CHEMICAL FIRE EXTINGUISHING EQUIPMENT

Textile Lint Fires



Flammable Liquid Fires

Gas Fires

Electrical Fires

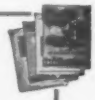
HAND PORTABLES
•
WHEELED PORTABLES
•
STATIONARY EXTINGUISHERS AND PIPED SYSTEMS
•
TRUCK MOUNTS, TRAILERS AND SELF-PROPELLED UNITS

Ansul Dry Chemical Fire Extinguishing Equipment has world-wide recognition as preferred protection for flammable liquid, gas and electrical hazards. Yet a surprising number of Ansul Extinguishers are used to protect textile mills and paper mills against serious loss from surface fires such as occur in textile lint and combustible paper dust. The textile and paper making industries rely on Ansul Extinguishers for quick control of dangerous flash fires in class "A" (ordinary combustible) materials. Any remaining embers are quenched with small quantities of water, thereby keeping water damage at a minimum.

Surface fires in textile lint and combustible dusts spread rapidly. They need quick control. If you have serious lint or dust hazards, talk with your Ansul representative. He may have suggestions to reduce fire damage and lost production time.

ANSUL MODEL 20-B

Send for File No. 915. You will receive a variety of helpful printed matter. Included is our latest catalog which describes Ansul Extinguishers of all sizes — from the small Ansul Model 4 to Ansul Piped systems and Ansul 2000 lb. Stationary Units.



ANSUL CHEMICAL COMPANY
Fire Extinguisher Division
MARINETTE • WISCONSIN

OFFICES AND DISTRIBUTORS IN PRINCIPAL CITIES IN THE U. S. A., CANADA AND OTHER COUNTRIES
ALSO MANUFACTURERS OF INDUSTRIAL CHEMICALS, REFRIGERANTS AND REFRIGERATION PRODUCTS

Nauvoo. "Believe has excellent prospects . . ."

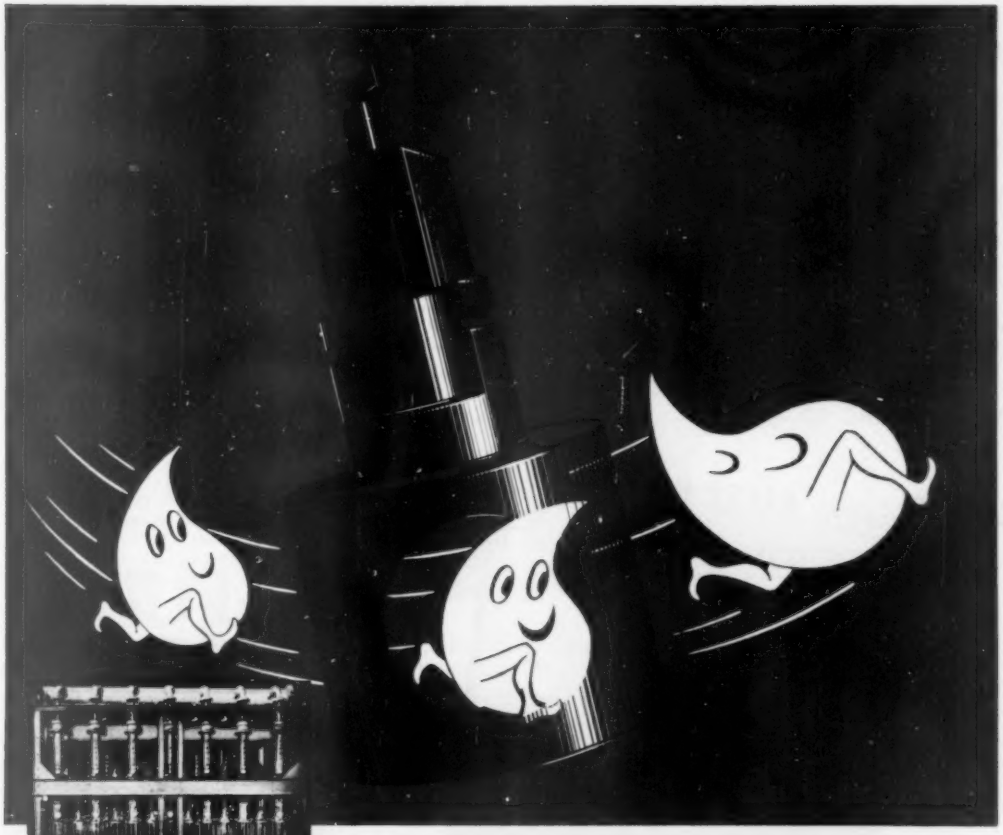
the wells tested at only 150,000 cu. ft. daily, the project was abandoned. Gas was used locally until flooded out by water.

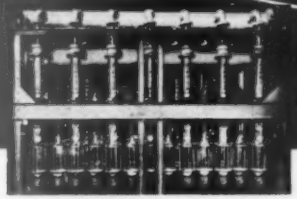
C. Nauvoo gas field (potential) . . . In 1945, Glenn Rose began prospecting at the northern terminus of a long anticline stretching from Manchester in Walker County, northwestward to near Poplar Springs in Winston County. The first well struck gas in Mississippian limestone, was lightly acidized and tested 750,000 cu. ft. daily. The second well was drilled near the Manchester end of the structure, and had a strong show of gas, also in Mississippian limestone. The third well was drilled near the first, encountered gas, and was capped. Inadequately financed and beset with ill fortune, the project was abandoned in 1947. The writer believes that the area offers excellent prospects for a commercial gas field, with the possibility of oil as well. The gas is dry. Most of the area is under a single ownership.

D. Hamilton gas field (potential) . . . In 1948, H. L. Cullet began his 1 Lewis, 3 miles southwest of Hamilton, in Marion County. A fishing job made him skid over to 1-A, which eventually resulted in a small gas well of 640,000 cu. ft. The producing horizon is the Bethel sandstone of Mississippian age. A stepout nearly 1 mile northward has just been completed, with similar results in the Bethel.

What the next move will be is not known. However, the proximity of the area to the Sanders (F on map) discovery accentuates its possibilities. Here also, financing has been inadequate at times. A vigorous and intelligent program would have excellent chances of success. The structure is an anticline, and believed to have a northwest-southeast trend. The Bethel was encountered at about 1,800 ft. in each well. It is thought that 5,000-ft. holes would cut all possible producing horizons. The position and extent of the structure have not been determined. Each well had shows of oil. The gas is pure methane.

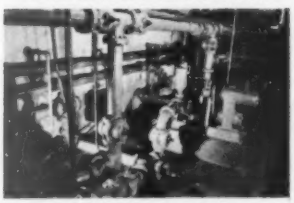
E. Belgreen gas field (potential) . . . While drilling a test northwest of Belgreen, in Franklin County, Owen Heath decided to drill some shallow holes to outline the structure. In the first of these he struck a heavy flow of gas at 370 ft. He finally managed to cement casing in the hole and contain the gas. That done, Heath is now con-





IN CHEMICAL PLANTS A.C.F. Round Port Valves provide quick emptying, full protection against corrosive action.

IN THE PETROLEUM AND GAS INDUSTRY A.C.F. Round Port Plug Valves provide full-area flow with fast shut-off.



IN SEWAGE PLANTS A.C.F. Valves offer uninterrupted flow. CYLINDRICAL plug actually shears obstructions.

100% OBSTRUCTION FREE

The passage of an A.C.F. Round Port Lubricated Plug Valve exactly conforms to the size and shape of the pipe. Ideal for capacity flow of abrasives and suspensions, these valves have the same quick, quarter-turn shut-off feature of rectangular port A.C.F. CYLINDRICAL "Full Pipe Area" Plug Valves. In addition, an A.C.F. Valve cannot wedge in its seat. Why tolerate a less efficient valve?

A.C.F. CYLINDRICAL FULL PIPE AREA PLUG VALVES

Write for Catalogue 4-OG, American Car and Foundry Co., Valve Division, 1501 E. Ferry Ave., Detroit 11, Mich.

Representatives in 50 Principal Cities

Gilbertown. "Alabama's first commercial oil . . ."

templating his next move. Structure is the Cedar Creek anticline of Semmes* and has an axis slightly west of north. The project has distinct possibilities.

F. Muldon gas-condensate field . . . The discovery well for this field, the 1 Sanders, is in Monroe County, Mississippi, opposite Lamar County, Alabama. The well was drilled in 1941, and abandoned. Since then, gas continuously escaping from the well caused Northeast Mississippi Oil Co. to attempt to clean out and rework the well. When the plug at 2,900 ft. was drilled out last November the well blew out. The blowout preventer was closed but failed to stop the flow of gas. Sand grains coming out with the gas cut off the drill pipe and the entire string dropped into the hole. A control valve was made fast after 5 days and the well brought under control.

The company then traded one-half interest in the block to Union Producing Co., which finished off the well and began stepout wells to the northwest and southeast. The open-flow potential was calculated at 35,000,000 cu. ft. of gas per day, with gas-condensate ratio of 100,000 to 1. On test late in February, the well flowed at a rate of 7,400,000 cu. ft. of gas per day through ⅝-in. choke. Tube pressure was 1,720 psi., while the casing pressure was 1,855 psi. The gravity of the condensate is 66.2°.

The structure is believed to be an anticline with northwest-southeast trend. While fish prevented a complete rework of the hole, the producing horizon is thought to be the Hartselle sandstone (5,270-5,505 ft.) of Mississippian age. In any event, the new field is of vital importance and will set off extensive drilling in Northeast Mississippi and Northwest Alabama.

*Semmes, D. R., Oil and Gas in Alabama, Geol. Surv. of Ala., Sp. Rpt. 15, pp. 101-102, map No. 6, 1929.

Southwest Alabama

G. Gilbertown field . . . Alabama's first commercial oil well, the 1 A. R. Jackson, was brought in on February 17, 1944, by Hunt Oil Co. Since then a total of 69 producers has been completed in Gilbertown field. Most of these were brought in by Hunt Oil Co. in the western part, and Carter Oil Co. in the eastern part, with a few completed by other companies and independents.

The field is located along the northern flank of the well-known Hatchetigbee anticline, where a fairly complex system of faults formed traps in the Eutaw sands and in fractured zones in the overlying Selma chalk, both of Upper Cretaceous age. The 1 Jackson is a chalk well, with production coming from 2,575-85 ft. The field extends from the Mississippi line to within 3 miles of the Tombigbee River, in an east-west direction. The structure extends across the river into Clarke County, where it becomes the Jackson fault. When subsurface conditions are better known, it is believed that a series of oil fields will be discovered at the same relative position along these very prominent and pronounced structures. Existence of other structures, now hidden below the surface, is not only possible but likely. It seems certain that a major uplift like the Hatchetigbee anticline must have formed smaller structures.

About a dozen of the West Gilbertown wells produce from the Selma chalk, the rest from the Eutaw. All wells in the eastern section produce from the Eutaw, except one, which is a dual completion well in each formation. The chalk wells range from 2,502 to 2,930 ft. Producing horizon in the Eutaw is from 3,179 to 3,572 ft. The gravity of the oil is 19° corrected. It is asphaltic base. Allowable in the field

PAINE DRILLING CO. SAYS . . .

"Thompson RATES HIGH WITH OUR CREWS

Because . . .

Thompson SEPARATORS DO A Two-Fold JOB . . .!

"FIRST, our Thompson Separator does an amazing job of reconditioning drilling muds by thoroughly removing shales and abrasives from this mud. Second, our separator has a Sample Machine. The Sample Machine gives us an accurate analysis of the progress of our wells by collecting foot-by-foot cuttings. For simplicity and economy alone, we feel the Sample Machine is one of the best methods yet devised for obtaining true samples."

Thompson SHALE SEPARATORS & SAMPLE MACHINES
- SELF-MOTIVATED
- RECONDITIONS MUD
- GIVES ACCURATE SAMPLES
- HAS UNLIMITED CAPACITY

SOLD ONLY THROUGH SUPPLY STORES

Thompson TOOL CO.
IOWA PARK, TEXAS

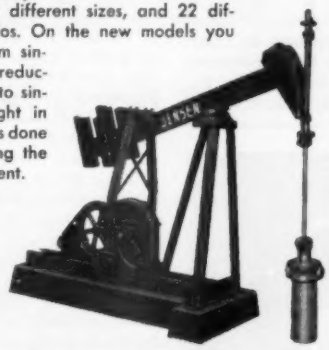
JENSEN

Pumping Units are available in 12 sizes

Whether your production is from a shallow sand or a deep test, there's a Jensen Unit to do the job better and more profitably.

There are 12 different sizes, and 22 different gear ratios. On the new models you can change from single to double reduction, or double to single, quickly, right in the field. And it's done without disturbing the basic gear element.

To get the most profit from ANY well, install Jensen. Write today or see your local Jensen dealer.



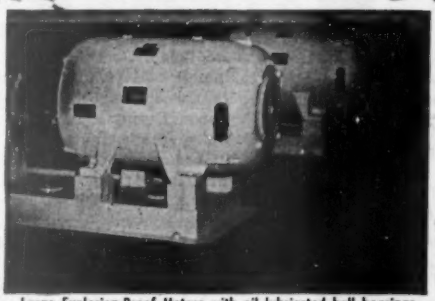
JENSEN

BROS. MFG. CO., INC., Coffeyville, Kansas
EXPORT OFFICE: 50 Church St., New York City

Continental

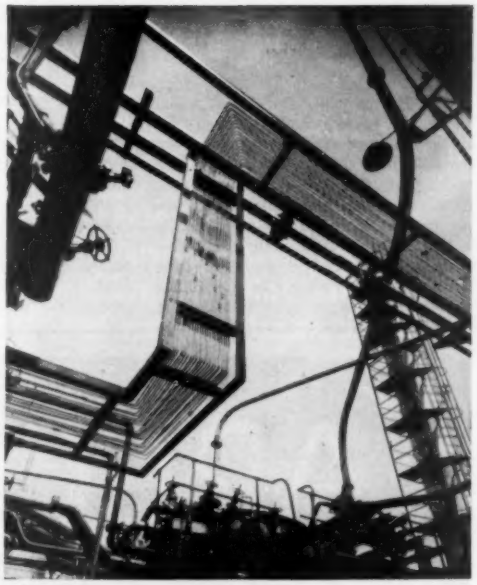
EXPLOSION-PROOF MOTORS

1 to 700 h.p.



Large Explosion-Proof Motors with oil lubricated ball bearings.

CONTINENTAL ELECTRIC CO., INC.
325 Ferry Street, Newark 5, N. J.
Plants—Newark, N. J. and Rockford, Ill.



SAVE up to 40%

ON COILED TUBE!

Alcoa Utilitube, the all-purpose aluminum coiled tube, offers you savings up to 40 per cent over other corrosion-resistant metals. It is ideal for carrying air for instrument and brake lines—gasoline and fuel oil for internal combustion engines—lubricating oil for engines and machines—fluids for hydraulic systems.

Alcoa Utilitube bends more easily than annealed copper . . . work hardens less . . . has excellent forming and flaring characteristics. In petroleum service, it will not cause sludge or gum formations. It will not discolor or contaminate the fluid it carries. It safely resists corrosion by hundreds of hard-to-handle compounds and industrial atmospheres. In extremely low temperatures, it actually improves in mechanical properties.

And aluminum tube fittings are available from leading tube fitting distributors. For complete information, write for the new booklet, *Alcoa Utilitube*.

ALUMINUM COMPANY OF AMERICA
839-F Gulf Building • Pittsburgh 19, Pa.

ALCOA

South Carlton. "Heavy oil, but has water drive . . ."

is 100 bbl. per day. Only eight wells, all in the eastern section, make the allowable. Most of the others produce from 40 to 100 bbl., with a very few making less than 40 bbl. All wells produce salt water, in amounts of a few per cent to more than 90 per cent. It is a water-drive field, with a very few wells having sufficient gas to operate the separators. Porosity in the Eutaw is about 32 per cent. Permeability ranges from 100 to 178 md.

Gilbertown oil is transported by pipe line to a terminal at old St. Stephens on the Tombigbee River, thence by barge to two refineries at Tuscaloosa. It brings $1.81 per barrel. The refineries make various grades of asphalt products, and ship excess distillates to other refineries to be blended into gasoline.

A permit has been granted to Carter Oil Co. for a deep test near the center of the best part of East Gilbertown field. It is planned to drive the well through the Smackover lime, or deeper.

ARCCO
ARCCO ANUBIS
LIQUID GRAVITOMETER
...for PIPELINES, REFINERIES, GASOLINE PLANTS
This ruggedly built instrument of laboratory accuracy is ideal for quick checking and for continuous recording of Specific Gravity of liquids under line pressure. Changes in Specific Gravity of sample are recorded with a very minimum of time lag. Foreign liquids and gases are automatically purged from sample. No moving joints or stuffing boxes to cause friction or leakage. Temperature corrected, this precision instrument is adaptable to high pressures. Hundreds are in daily use in plants and refineries of major companies. Also available as a controlling instrument. Send for bulletin No. 111A.
AMERICAN
RECORDING CHART CO.
3113 E. 11th St. • Los Angeles 23, Calif.
Available for Early Delivery
SEND FOR BULLETIN No. 111-A

H. South Carlton field . . . Discovery well in this field was the 1 J. H. Wall Estate of Humble Oil & Refining Co. The well was completed on May 6, 1950, in the glauconitic sands of the lower Tuscaloosa formation at 5,417-29 ft. Initial tests were about 100 bbl. per day of heavy (14° corrected) asphaltic oil.

Since then Humble has completed eight wells in Clarke County and one on the left bank of the Alabama River in Baldwin County. Allowable in the field is 100 bbl. per day, with actual production ranging from 40 to 100 bbl. This also is a water-drive field and all wells make some salt water. All produce from the same horizon. A deep test is in progress, to determine whether or not deeper sands exist. A higher-grade oil would be very desirable.

Structure is an anticline with north-south axis. Its base is about four locations wide. Its length is yet to be determined. Until Sun Oil Co., which has leases on the area in Baldwin County, carries out its exploration, the limits of the field cannot be known.

The oil is shipped out by barge and brings $1.35 per barrel. All locations have to be made on ramps built up some 15 ft. above the swamp floor. During last summer Humble built a road into the field from South Carlton. Until then the drilling program was serviced by water transportation. The operation is a costly one.

In the discovery well 1 gas and 91 oil shows were observed, 16 of which received drill-stem tests before the seventeenth test resulted in the completion. The shallowest horizon tested was 4,275-85 ft., and the deepest 7,314-21 ft. Some of the shows were lighter in color and much higher gravity. Deep tests may be successful.

I. Pollard field . . . On January 19, 1952, Humble 1 A. W. Moye provided the spark that set off Alabama's second hot spot. During a drill-stem test the well blew in after 25 minutes. The oil is 30° corrected. After completion, the well produced 340 bbl. per day through ⅛-in. choke. Shut-in pressure was 2,600 psi., while open pressure was 2,175 psi. The potential was estimated at 1,000 bbl. per day, by far Alabama's best well. The producing horizon is the glauconitic sand (Pilot sand) of the lower Tuscaloosa. Saturated sand was 27 ft. thick, with top at 5,945 ft. Production string was perforated with 20 shots from 5,945-49 ft. No basic sediment or water is present. Gas-oil ratio is 45 to 1.

Structure in Pollard field is a fault with general northwest-southeast trend. Since the discovery two stepouts, one

Producers

Refiners

Marketers

Most complete line of HIGHEST QUALITY *PETROLEUM PRODUCTS*

CITIES SERVICE

Have you ever heard?—of this remarkable chemical compound that cleans all machinery, rigs, tools, draw work, drilling equipment, heat exchangers, pipes and storage tanks—that removes grease...oil...sludge...paint or carbon...quickly and safely—that requires no heat...will not attack iron, aluminum, copper, etc...and rinses freely with water?

KELITE FORMULA 504 does all these things and will do them for you at a low, low cost. Mail the coupon below for complete information.

Chart Copyright 1942

P. S. In the shop and in the field, men like KELITE WATERLESS HAND SOAP — because it cleans dirty hands right on the spot . . . without water. A small amount rubbed on hands before working retards soil penetration. Send for your free sample today!

KELITE

REG. U.S. PAT. OFF.

1250 North Main Street, Los Angeles 12, California
Service Offices in 86 Principal Cities

☐ Send a Free Copy of Bulletin 114 describing KELITE cleaning compounds for the Petroleum Industry.

☐ Yes, send me a Free Sample of KELITE WATERLESS HAND SOAP.

Name_____

Company_____

Street_____

City_____ Zone_____ State_____

Tollard. "Area swarming with geophysical crews . . ."

1 mile east and ¼ mile south and the other ½ mile east and ½ mile south, were dry. The fourth test, a south offset to 1 Moye, was completed as a producer at a depth of 5,974-80 ft. Subsea difference in this well and the 1 Moye is 50 ft. The well tested 120 bbl. of oil and 60 per cent salt water per day on pump.

The fifth test, 2 Moye, west offset to 1 Moye, was taken on down to the Tuscaloosa Massive sand, where perforations at 6,092-6,101 ft. tested 117 bbl. of 26°-gravity oil per day through ⅝-in. choke. Flowing pressure was 40-70 psi. That is the first time that oil has been found in the Massive sand in Alabama, though it has been expected. The discovery opens up new and fruitful avenues. After testing in the Massive, the well was completed at 5,918-24 ft. in the Pilot sand, where approximately 41 ft. of saturated sand and an additional 20 ft. of spotted sand were cut. Subsea top of the Pilot sand in 2 Moye was 1 foot higher than in 1 Moye. The 2 Moye may be a better well than the discovery well. Tests are in progress as this is being written.

THE VERSATILE Beaver
Eager Beavers are proving their capacity for hard work in 15 different countries throughout the world.
They operate in tropical heat or arctic cold . . . are equally at home on either wheels, floats or skis.
The seaplane can carry a payload of 1260 lbs. with 200 miles range. It takes this impressive payload off the water in 15½ seconds in a distance of 775 feet (zero wind).
The landplane and skiplane performance are equally as impressive.
Write for complete particulars.
THE DE HAVILLAND AIRCRAFT OF CANADA, LIMITED
POSTAL STATION "L" TORONTO, ONTARIO
Telegrams — "Moth" Toronto

The 1 Lovelace, a stepout about 3 miles to the southeast, is almost down to the Pilot sand. Its progress will be closely watched.

The discovery came as no surprise, for Stanolind Oil & Gas Co. almost had a producer late in 1951 when it barely missed a completion in its 1 Steward in the same horizon and a little more than 1 mile to the southwest. In 1 Steward the oil was 25° gravity. Presently jockeying for leases, title work, and surveys occupy the stage. Most of the acreage is held by Humble, Stanolind, and Gulf Refining Co. A recent lease for a bit over 60 acres sold for a bonus of $300 per acre. That is believed to be the highest bonus paid in Alabama, although bonus payments of $100 to $200 are common enough. It is expected that the drilling program will start in earnest as soon as the land men finish their work and the titles have been cleared. The entire area is swarming with geophysical crews and core-drill units. The whole story should not be long in unfolding.

The structure was found by geophysics and checked by core drill. It is interesting to note here that several similar pictures have been spotted in Escambia, Monroe, and Clarke counties. Alabama should experience considerable play in the next few months.

J. McIntosh salt dome . . . A seismographic crew working in Washington County in 1949 came onto a shallow salt dome. Later a core-drill outfit cut the top of the salt at 422 ft. Several chemical plants are now established in the area. Other salt domes should occur in Southwest Alabama. Whether or not any will produce oil is yet to be determined.

K . . . Of special interest to Alabama is the discovery of oil in Gulf's A-1 Chapman, some 4 miles east of Hiwannee, Wayne County, Mississippi, and less than 6 miles west of the Alabama line. The well had several shows, and was finally finished at 9,595-9,608 ft. where a drill-stem test raised 494 bbl. per day of 38.5°-gravity oil through ¼-in. choke. Flowing pressure was 400 psi. This discovery should set off a lot of activity in Choctaw and Washington counties.

L . . . Recently the writer had an opportunity to study the area of the long-abandoned Huntsville gas field and vicinity. Two nice domes were spotted with ease. Surface geology and core drill could be employed to advantage in the whole area of the Tennessee Valley (Province 7). Wells would be comparatively shallow and inexpensive.

LIGHT!

for FAST, ACCURATE

SOIL RESISTIVITY TESTING

New Model 243A Vibroground has all the features for "painless" field use, plus rugged construction and high accuracy. Check the data below . . . then write today for complete details and price.

- DIRECT READING . . . 0 to 30,000 ohms/cm.³
- FAST, TWO-STEP OPERATION
- WEIGHT only 8½ lbs. with cover removed!
- SMALL . . . 9" x 6" x 6½"
- ACCURATE to 2% of full scale
- TOUGH . . . steel case . . . shatterproof glass . . . baked enamel scale
- LOW UPKEEP . . . standard flashlight cells . . . spare vibrator built in . . . spare probe tip

ASK FOR BULLETIN 105A

ASSOCIATED RESEARCH, Incorporated

"Precision Instruments Since 1936"

3761 WEST BELMONT AVENUE • CHICAGO 18, ILLINOIS

Always Cold Water Gotkool WATER CANS AND COOLERS

GOTT Water Coolers are the convenient way to keep drinking water handy to the worker, protect it from impurities. Their exclusive construction keeps water cool for long periods. Snug-fitting, large, removable top, handy, non-leaking, push-button faucet. GOTT Water Cans for handy field use. Your supply store has them, get one today!

GOTKOOL WATER CAN Made in 1½, 2, 3, 5, 10, 15 and 20 gallon sizes. Push - Button Faucet at slight additional cost.

GOTKOOL WATER COOLER Made in 2, 3, 5, 8, 10, 15 and 20 gallon sizes with Push-Button Faucet.

KEEP PURE DRINKING WATER ALWAYS HANDY

INSIST ON THE GENUINE . . . Look for the Blue and Black Label With the Name GOTKOOL in Red.

H. P. GOTT MFG. CO.

WINFIELD, KANSAS

Federated Magnesium Anodes Cut Corrosion Losses

Corrosion costs money, but corrosion losses can often be eliminated by using Federated Magnesium Anodes.

Federated anodes fight corrosion in underground piping, tanks, or other buried metal structures . . . prevent oil, gas, and water leakages . . . protect surrounding equipment and property . . . remove fire and explosion hazards.

Federated Magnesium Anodes are high quality products with several exclusive features. Each has an electro-galvanized spiral strip core chemically bonded to the magnesium alloy to assure perfect electrical contact between the metal of the anode and the metal to be protected. The core extends the full length of the anode too, assuring uniform anode consumption. All connecting wire joints are silver-soldered for low resistance and high strength.

Federated Magnesium Anodes are available in every standard size . . . a variety of special sizes can be had at little or no extra cost.

For technical assistance with your corrosion problem, write Federated's *Corrosion Advisory Service*. For a recent informative bulletin on Magnesium Anodes for Cathodic Protection, write Department OG.

For magnesium anodes . . . for any non-ferrous metal or alloy . . . see Federated first.

Federated Metals Division

AMERICAN SMELTING AND REFINING COMPANY

120 Broadway, New York 5, N. Y.

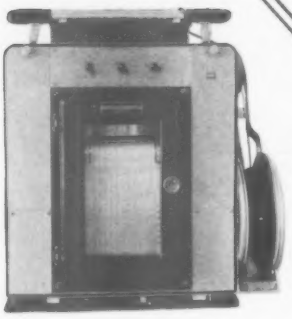
500 FT. UNITS

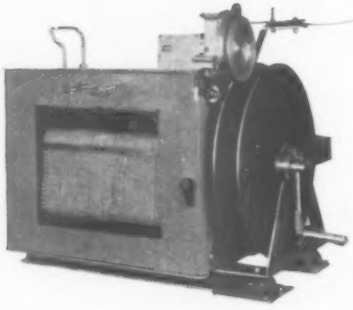
1000 FT. UNITS

2000 FT. UNITS

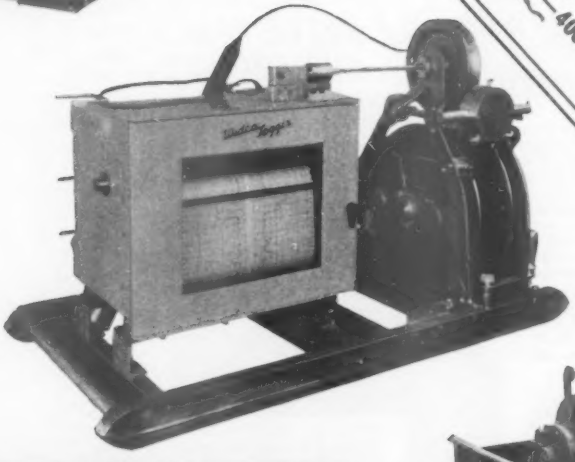
4000 FT. UNITS

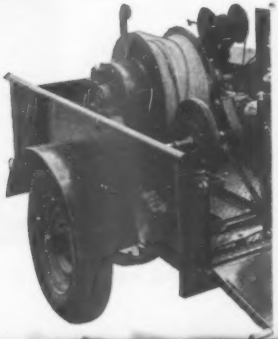
Widco Electric Loggers





for
core holes
shot holes
water wells
shallow
production
etc.



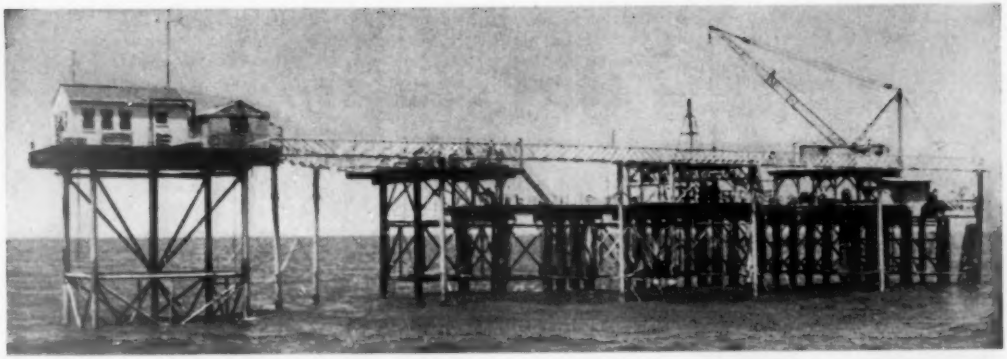


WELL INSTRUMENT DEVELOPING CO.

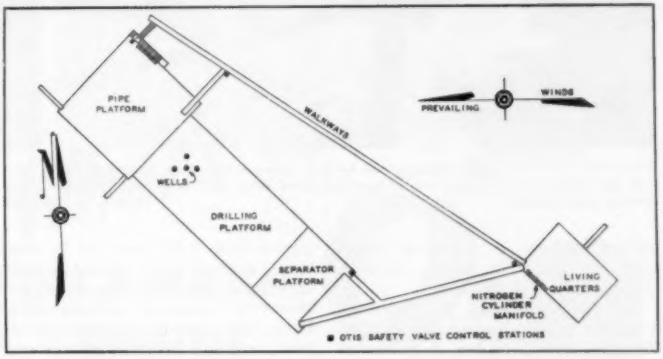
P. O. BOX 2406 HOUSTON, TEXAS

ELECTRIC LOGGING INSTRUMENTS

HUBERT GUYOD PRESIDENT



QUARTERS AND MAIN PLATFORM are shown in this over-all view of offshore installation, plan of which is shown at right. Utility house is next to quarters.



When four high-pressure wells are being produced 9 miles from shore, from a single platform, extreme safety measures must necessarily be the rule. It goes without saying . . .

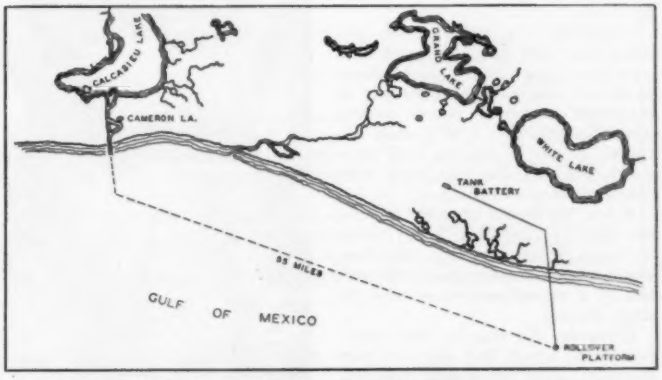
They Don't Take Chances In Rollover Field

by I. W. Alcorn* and J. N. Donhaiser†

FOUR wells are currently producing from one platform at Pure Oil Co.'s Block 39 field, West Vermilion area Louisiana, referred to as Rollover field. Provision has been made for one more additional well to be drilled. While this platform is located approximately 9 miles offshore in 40 ft. of water, it requires a boat trip of 55 miles to reach it from the port base of Cameron, La.

Production was commenced with the completion of pipe-line facilities by Marine Gathering Co. and Tennessee Gas Transmission Co. Examination of the producing sand section indicated that volumes in the order of 10 million cubic feet per day per well may be produced without excessive drawdown at the sand face. Such producibility is practically necessary to insure economic operation due to excessive costs of wells and operation.

Therefore, considering the magnitude of the investment confined to a small area and with the added possible loss of human life, it is almost needless to emphasize the importance of exercising every reasonable precaution to eliminate or minimize all possible hazards.

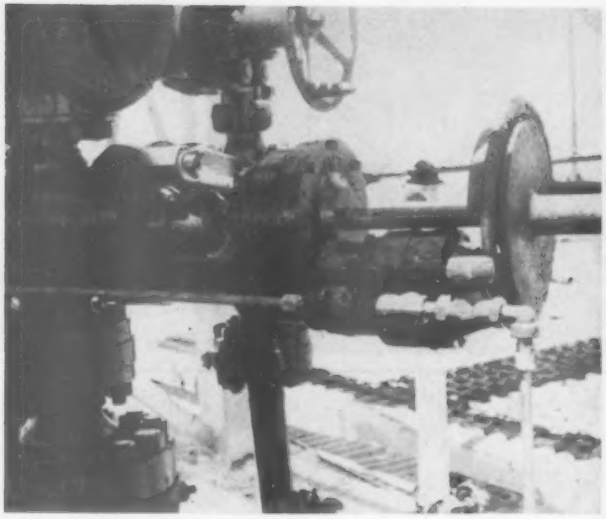


LOCATION MAP of offshore platform, situated 9 miles from Louisiana coast.

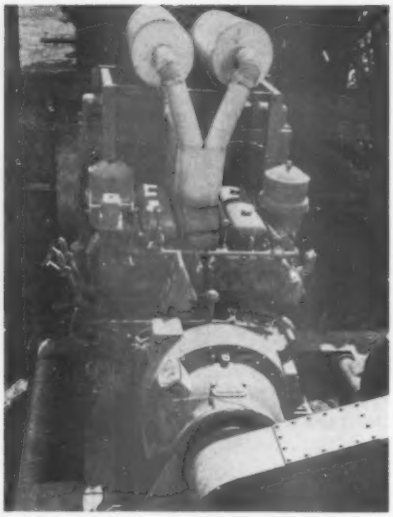
Requirements

In producing high-pressure (3,000 psi.) gas-condensate wells from such a

*Division production engineer, and †production engineer, Pure Oil Co.



MASTER VALVE on each offshore well head is equipped with both remote manual and pneumatic controls which can be operated from either of two stations. Stations operate independently.



ALL ENGINES on the work-over rig are full diesel. Exhaust systems are completely insulated and equipped with spark-arresting water-jacketed mufflers.

central platform, a number of things are recognized as being required. Among these may be listed:

1. Accommodations for personnel, requiring space, heating and cooking facilities, also operation of generators for lighting and other power requirements.

2. Operation of a stiff-leg derrick is required for loading and unloading men and materials.

3. Periodic running of bottom-hole pressure instruments.

4. Eventual workover rig operations must be anticipated, coincident with producing.

Ordinarily, the operation of gas-condensate wells with low-temperature separators and steady load factor would not require much in the way of personnel; however, under existing conditions offshore, it is deemed advisable to start operations with additional personnel and later make such reductions as prove practical.

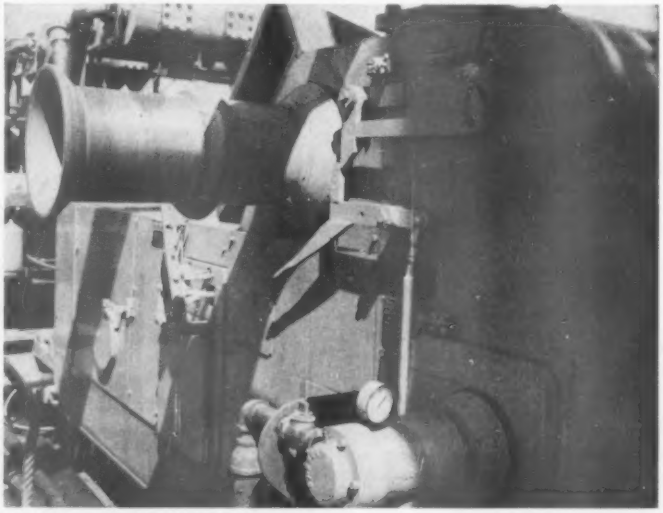
It was considered advisable to have two men in attendance at all times, 24 hours a day, in case something would happen which required the services of a second man to actuate the safety devices.

Currently, this plan has been modified to the extent that only one man (pumper) is in attendance; however, during the daytime hours, two roustabouts are employed, together with a gang pusher and cook. In addition, a company-owned crew boat stands by 24 hours a day to assist in any possible emergency.

Twenty-four hour two-way radio service, both A.M. and F.M. is maintained between the structure, standby crew boat, shore tank battery, port of operation (Cameron), superintendent's home, Coast Guard, marine shore stations, and all other company-owned crew boats and platforms. Weather conditions and forecasts are received and recorded on the platform every few hours. In the event of hurricane conditions steps to be taken for the shutting in of wells, securing of equipment, and abandoning of platform by all employes, are plainly posted.

General Layout

Accompanying are plan drawing and photograph of the over-all structure. The consideration of quarters accommodations and location came in for considerable study and discussion. Eventually, it was decided to construct a separate structure. Its location was based on a daily survey of prevailing



SAFETY DEVICE on work-over rig makes it impossible for traveling block to be pulled into the crown. Drum clutch is automatically disengaged and air brakes are applied to the draw-works drum when approach is too close.

winds in this area over a period of approximately 2 years, which indicated that the wind blew only 3.8 per cent of the total time from the hazard area (wells and separators) toward the quarters location.

As a general premise it was decided to concentrate all possible sources of ignition on the quarters platform and in the event the wind direction was from the hazard area toward the quarters all open fires would be extinguished.

The separator platform was likewise an addition to the original platform—to retain space for future workover operations and to segregate this area from the well area as much as practicable.

The walkway arrangement, which provides an approach or escape to or from the main structure from either end, affords additional safety for operating personnel. Steel guard rails are installed on the circumference of both the main structure and quarters platform and completely line all walkways.

All main platform and walkway flooring, with the exception of a small space on the pipe-rack platform for loading and unloading material, is of expanded metal or steel grating. Otherwise, the platform is constructed of steel tubular or beam sections.

The lighting system of the main structure consists of explosionproof fixtures and all control switches are located in the generator house located on the quarters platform. All lighting and power lines are in conduit.

There are 17 strategically located life-ring stations on the Rollover structure. These life rings are equipped with adequate rope, which is secured to the platform, to reach any possible location from which a man might leave the structure. The platform is equipped with three life-raft stations, two of which are located on the main structure and one on the quarters platform. Two escape ramps and Jacob's ladders are located on the main structure and one on the quarters. All personnel are required to wear life jackets when it is necessary to do work below the platform deck level and when transferring from platform to crew boats.

No smoking is permitted except on the quarters platform and only safety matches are used. In the event of a west wind, all fires in the galley are extinguished and no smoking is allowed, even on the quarters platform, for the duration.

The platform is completely equipped to comply with all Coast Guard regulations. Special platform lights, battery operated, are installed on each corner of the structure.

Fog horns of Coast Guard-approved type are also located on the platform.

An air whistle is installed to give warning, or signal the standby crew boat in the event of radio failure.

Safety Features

In general, there are two ways in which a major catastrophe could occur, the worst situation being an event resulting in the structure being swept away or demolished. This could happen either due to some heavy object, such as a large ship or barge ramming it, or to an unusually severe hurricane.

The lesser situation could result from a rupturing of some part of the high-pressure equipment or system and enveloping the structure with gas and spray of condensate and subsequent ignition.

As a precaution, in the event the structure was swept away shearing the casing below the master valve, two landing nipples are installed in the tubing string well below the gulf floor level. Inserted in the lower nipple is a differential or storm choke. This choke is designed to shut off the flow from the well if the rate of flow is increased to a predetermined amount, such as would result in such an eventuality.

In the second and upper landing

Just a repair bill? No. It costs more . . . it costs you loss of *time and needed man-hours for productive work!* That's why your engines should be protected by PENN Safety Controls.

Here's a control that prevents little troubles in engine lubricating and cooling systems from *growing into major breakdowns!*

Learn more about this low-cost protection for *new and old engines.* Three basic control models are available for oil pressure, water temperature, and combination pressure and temperature. Write **Penn Controls, Inc., Goshen, Indiana.** Export Division: 13 E. 40th Street, New York 16, N. Y., U. S. A. In Canada: Penn Controls Limited, Toronto, Ontario.

Typical Functions of PENN Safety Controls

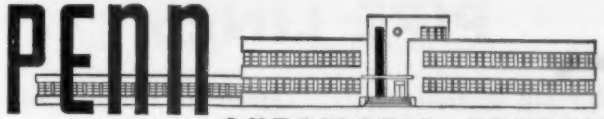
Diesel Applications. Sounds an alarm . . . closes magnetic fuel valve and sounds alarm . . . closes magnetic fuel valve only . . . closes magnetic fuel valve and opens pilot relay.

Battery Ignition Applications. Opens battery circuit and sounds an alarm . . . sounds an alarm only . . . opens battery circuit only.

Magneto Ignition Applications. Sounds an alarm only . . . grounds dual magneto . . . grounds magneto only . . . grounds magneto and sounds alarm or lights signal light.

Dual Ignition Applications. Opens battery circuit and grounds magneto.

PENN



AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, PUMPS, AIR COMPRESSORS, ENGINES, GAS RANGES

nipple provision is made for a blind or blanking choke. While the well is producing, this blanking choke, of course, would not be installed; however, in the event of hurricane warning and abandonment of the platform, such chokes would be installed.

In all such operations, it is general practice to set the tubing with a production packer, designed to seal off the annulus between the production string of casing and the tubing. This space is left filled with weighted mud fluid, thus preventing flow from the reservoir up through the annulus of casing and tubing.

At the surface, and immediately off the tree, each well is equipped with a 3-in. Otis automatic flow-line valve, designed to give three-way protection downstream of the tree. This valve will shut in automatically under the following conditions:

1. Any rupture upstream of the choke.

2. Any rupture downstream of the choke.

3. Any pressure buildup over the rated low-pressure vessels downstream of the choke.

Aside from the automatic features of these valves, there are lines connected to the pilots of each valve, leading to four remote stations, on the platform, for manual closing of these valves.

To further protect the low-pressure vessels, there are pop valves and bursting heads. There are check valves in the 6-in. gas lines and 2-in. condensate lines. These check valves prevent the products backing up from the common header in the event of a pop-valve opening or the rupturing of a bursting head.

Each well-head master control valve is equipped with a manual-control extension, which allows the closing of these master valves from a remote position on the pipe-rack platform. Also each well-head master valve and the Marine Gathering Co.'s flow line valve are equipped with pneumatic limit motor controls, which can be operated from two remote stations. One of these is located on the quarters platform, and the other is located on the northwest corner of the main drilling platform. Nitrogen cylinder manifolds are set up at these two stations and connected to the limit control valves by pressure-tested lines. These nitrogen cylinder banks, charged to 2,200 psi. pressure, supply the energy required to close all master valves and the 8-in. Marine flow-line valve in the event of an emergency.

All high-pressure flow lines leading from the well-heads to the separators and metering equipment as well as all high-pressure components were designed on a 2½ to 1 design safety factor, based on maximum pressures. The complete high-pressure system, when installed, has been hydrostatically tested to 1½ times the maximum working pressure.

All bends and turns in the high-pressure flow lines are drilled with 1/32-in. diameter by 0.03-in. deep weep holes. These weep holes are located at all such points where maximum corrosion or erosion might be expected to occur and are designed to indicate, by a leakage of gas and/or distillate, any reduction in wall thickness. The weep holes are drilled to a depth which will indicate a reduction in wall thickness before the reduction becomes dangerous.

Operational Safety Features

It is recognized that certain operations which require power units must be conducted in the so-called hazard area. Such operations might be a workover job, bottom-hole-pressure survey, or crane operation; while producing operations are being conducted simultaneously. Full diesel engines have been selected and used throughout, being deemed the most desirable from the standpoint of fire hazard or ignition.

H. B. ZACHRY CO.

GENERAL CONTRACTORS

Skill

★

Integrity

★

Responsibility

SAN ANTONIO, TEXAS

Constructors of

PIPE LINES

Oil Field Stations • Electrical Installation

Pure Oil Co. has recently assembled a new workover rig designed especially for this service. This is a modern, diesel-powered, torque-converter rig.

In order to render such a rig ignition-proof while running, the following modifications as related to an ordinary rig were required.

1. The engines are equipped with what is termed an "engine kill." The driller, by manual control, cannot only shut off the fuel injection to all engines, but also close a butterfly valve in the air intake. (Under conditions of gas envelopment a diesel engine could continue to run, and without the effect of a governor, if the fuel injection only was ceased).

2. All engines are equipped for air starting only. For this purpose a complete air piping system is provided, the compressor being located on the quarters platform.

3. The exhaust manifolds and exhaust pipes on all engines operating in the hazard area have been insulated, and sparkproof and water-jacketed mufflers with water spray injection have been provided. These are designed to maintain temperatures well below the flash point of gas-condensate mixtures.

4. Special rig lighting has been provided consisting of explosionproof fixtures and conduit-enclosed lighting string.

5. All engines are equipped with high-carbon static-eliminating fan belts.

6. The workover rig has been equipped with a mechanical crown-block-safety device. This device is designed to positively prevent pulling the traveling block into the crown, with subsequent dropping of the traveling block and possibly causing serious damage to the producing christmas trees.

7. Diesel-fuel transfer from platform level to elevated fuel tanks is accomplished by an air turbine powering a rotary gear pump, thus eliminating need for an electric motor.

The above safety items pertaining to diesel engines also apply to the diesel-powered wire-line unit, for taking bottom-hole pressures and servicing down the hole chokes, and the diesel-powered crane.

Other Features

1. Strategically located throughout the platform are salt-water fire-hose stations with fog nozzles. In addition, there are numerous chemical fire-extinguishing units.

2. In the transfer of personnel from and to the platform and crew boat, the most satisfactory method has been by means of the crane and rope basket.

3. An effective system of signs has been devised to point out all hazards, warnings, and instructions.

4. A color system has been adopted to assist the personnel in quickly identifying the various pipe systems and equipment.

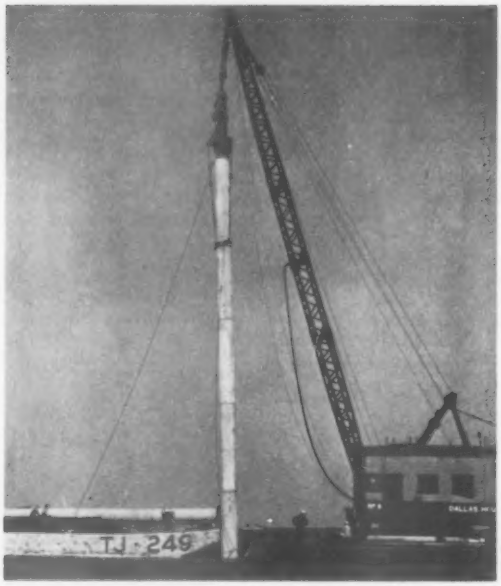
5. On each platform there is provided a Mine Safety Appliance asbestos suit and pneolator with auxiliary attachment for treating two patients simultaneously. Personnel, through safety meetings, have been thoroughly trained in all phases of the safety program.

6. Provisions for well-head protection when drilling or working-over are ¼-in. steel sheet flooring under drilling floor and steel housing over well-head christmas trees.

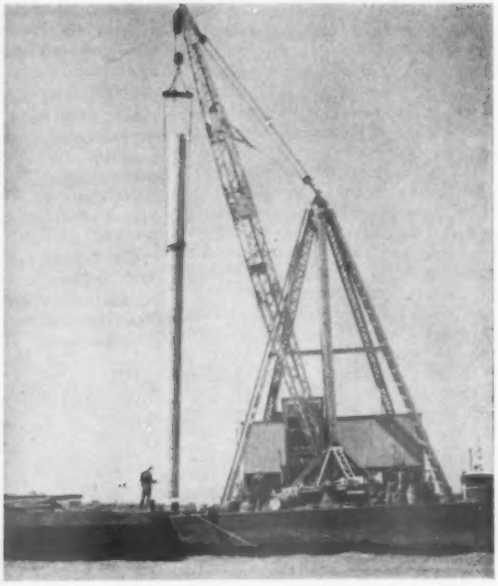
Oil Protects Food

Various petroleum products have been found helpful in protecting food on its trip from grower to consumer. Thin films of paraffin wax are used to preserve fruit, vegetables and eggs by sealing in their moisture. A petroleum-impregnated wrapper is widely used on fruit, keeping it fresh for several weeks. Even after storage in uncooled rooms, the fruit retains most of its moisture content. Unwrapped fruit loses at least 25 per cent in the same period.

YOU GET
Increased Throughput
from
Existing Equipment
WITH
METEX MIST
ELIMINATORS
Many refiners have found by experience that Metex Mist Eliminators, installed in stills, towers, drums, evaporators and similar equipment, have increased throughput of on-grade production and reduced operating costs by *removing 95% plus of liquid entrainment.* These knitted wire units literally "wipe out" the liquid droplets entrained in gases. Gases pass through and on . . . freed of entrainment. Liquids fall back against the rising flow.
EASILY INSTALLED
NO MOVING PARTS
Full details on these entrainment separators — sizes, shapes, construction and engineering data — are found in our new 8-page bulletin. Write for your copy today. Just ask for "Metex Mist Eliminators."
METEX
METAL TEXTILE CORPORATION



GALVESTON BAY—Setting a 96-ft. piece of 36-in. diameter prestressed pipe piling. (Coastal Construction Co., Houston, contractors.)



Setting a 64-ft. piece of 36-in. diameter prestressed pipe piling, Galveston Bay. (Trinity Valley Material Co., Anahuac, Tex., contractor.)

Prestressed Concrete Pipe Piling Protects Wells In Open Gulf Waters

by H. B. Spiller*

WELLS completed in open water, either in bays or the Gulf of Mexico, require protection from corrosion, wind and wave action, and floating objects. The Gulf Coast division of Sun Oil Co. is using prestressed concrete pipe piling to accomplish a part of the needed protection, and up to the present time the method has proven very satisfactory.

The first well in Galveston Bay and first well in the gulf of Sun Oil Co. were drilled prior to the introduction of the prestressed pipe piling. The extremely high maintenance cost on these two wells has led us to believe that the method described in this article is the most economical solution to a very expensive problem.

Each piling is made up of 16-ft. sections having a 36-in. outside diameter and 4-in. wall thickness. Each section is centrifugally spun with an outside form only, and is reinforced with a spiral cage of No. 3 high-tensile-strength wire. The spiral reinforcing is necessary to facilitate handling the sections prior to prestressing.

The sections are cast with eight, twelve or sixteen 1-in. diameter holes lengthwise of the section in the center of the wall to contain the prestress cables. Each of the cables is made up of 12 No. 6 high-tensile-strength wires.

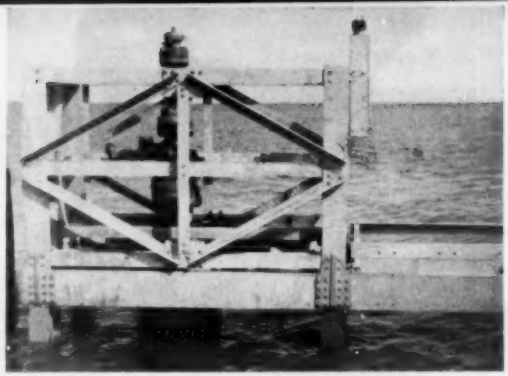
Enough sections to make up the desired length of piling are placed end to end on a "cradle" where the holes can be aligned exactly, a plastic joint compound is spread on the ends of the sections, and the prestress cables run through the holes, fastened to one end and stressed by hydraulic jacks at the other end. The cables are stressed to 150,000 psi. and held by locking cones, while grout is pumped in the holes under 100 psi. pressure. After the grout has hardened, generally 24 to 48 hours, the locking cones are removed and the cables cut off flush with the ends of the piling.

The number of cables to be placed in the piling is dependent on the use to which it will be put. For bay wells where the pipe is projecting above the mud line only 10 ft., eight cables are used. For offshore work where the top of the piling will be 25 or 30 ft. above

View of 64-ft. piece of prestressed concrete pipe piling at completion of driving, Galveston Bay. After temporary guide pilings are driven this location will be ready for the drill barge.

*Civil engineer, Gulf Coast Division, Sun Oil Co., Beaumont, Tex.

Steel well guard and boat landing, Galveston Bay. A steel grating deck and timber rubbing strips had not been installed when this picture was taken.



Closeup view of steel well guard, complete except for steel grating deck. Top of the concrete pipe is 4 in. below the deck level of the boat landing.

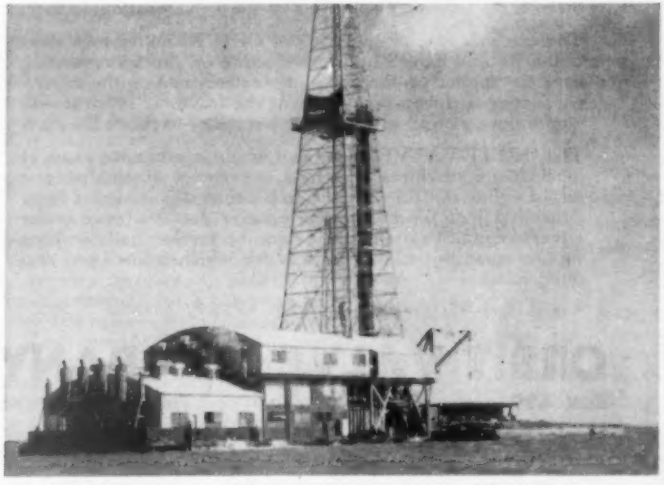
water it would be best to use 16 cables.

The method of manufacture is such that it is impossible to make up piling in the field, so it is necessary to arrive at the desired pile length prior to prestressing. This has been done by test borings or by observation of driving of other piling in the vicinity of the work.

Of the eight platforms constructed in Galveston Bay, piling of seven was driven to virtual refusal, bottomed in a thick sand stratum. For locations in inland waters practice is either to dredge or fill so that the water depth is 6 to 7 ft. at normal tide, and to use a drill barge with a 12-in. hull. The piles are cut off 10 ft. above the bottom so that the top of the piling is below the deck of the barge even if the barge settles as much as 2 ft. By keeping the concrete below the deck it does not interfere with setting blowout preventers and other equipment, and it is far enough out of the water to take care of the critical corrosion area at the water line. The christmas tree is set immediately above the concrete.

After the drill barge is in place, piling is drilled through to whatever depth it is desired to set conductor pipe. Circulation of drilling mud washes the inside of the concrete pipe clean, and the 16-in. conductor pipe is then cemented inside the concrete pipe. It is questionable whether the cementing does much good from a corrosion standpoint, but it is almost doubles the ultimate bending strength.

The concrete pipe is exceptionally dense, having a comprehensive strength in excess of 6,000 psi., and the prestressing makes the pipe capable of resisting large bending moments without tension cracks. Wind and wave action that would crack ordinary reinforced concrete enough to admit water, even though there was no structural failure, will not overcome the initial concrete compression in the prestressed pipe. This results in the pipe being virtually waterproof at all times.



This photo shows Sun Oil Co. drill barge No. 2 drilling in Galveston Bay.

THE AUTHOR

H. B. Spiller is civil engineer, Gulf Coast division, for Sun Oil Co., at Beaumont, Tex. He is a native Texan, and received both his bachelor and professional degrees at University of Texas. Following a 4-year tour of service in the Navy, he was associate engineer with Mitchell & Hunt, consulting engineers of San Antonio, and then joined Sun in 1948.

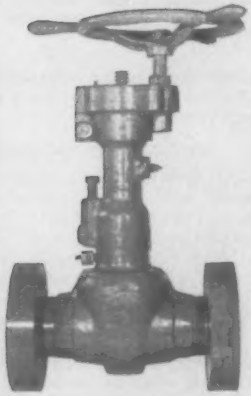
Steel Structure Safeguards

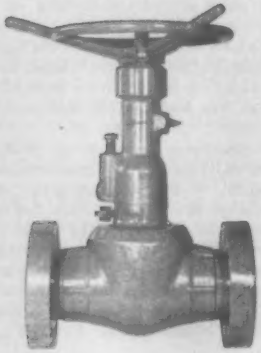
As further protection against wave action, and to afford protection from boats, barges, and floating debris, a prefabricated steel structure 5 ft. wide by 10 ft. long by 7 ft. high is installed around the completed well. Attached to this structure is a steel boat landing platform 5 ft. wide by 20 ft. long.

The steel structure is all galvanized, and is supported by steel bearing piles. The steel piling are treated against corrosion by "metalizing" or painting with one compound or another, and in some instances by cathodic protection. A steel structure is undesirable from the corrosion standpoint, but it is necessary to use steel in order to obtain the required strength with a structure small enough that a drill barge can be brought back over the location for workover purposes.

The use of either 36 or 54-in. prestressed pipe piling is planned for protection of Sun's future wells in the Gulf of Mexico, for which the top of the concrete pipe will be 25 to 30 ft. above the water. Effects of wind and waves will be much greater due to greater depths of water, but the strength of the concrete pipe is such that no trouble is anticipated.

There's Only One ORBIT VALVE





Only ORBIT VALVES® have these features of design . . .

ORBIT FORGED STEEL VALVES have been designed with a friction free seating principle. To the operator this means longer service at lower maintenance costs because the absence of friction in seating means greatly reduced wear at the point of seat contact. Since there is no contact between the core and the body, or the core and the body seat, there is no rubbing or scuffing of the valve seating surface.

The extreme ease of operation of Orbit Rising Stem Valves is due to this fact; Fluid loads acting on the valve seating core are applied on the trunnions, rather than on the spherical seating surfaces, thus reducing the frictional lever arm to a minimum, as well as the torque necessary to rotate the core.

The ORBIT VALVE taken as a whole is a precise piece of mechanism, machined to close tolerances, assembled and tested under skillful supervision because it is designed to be depended upon for an easy and positive shut-off (even under adverse conditions) and must stand up mechanically without failure when put to the services for which it has been recommended.

Carried in Stock by Supply Stores

ORBIT VALVE COMPANY

Box 699 **Tulsa, Oklahoma**

BRANCHES

HOUSTON, TEXAS
407 Velasco
(Serving the Gulf Coast)

ODESSA, TEXAS
402 West County Road
(Serving West Texas)

CASPER, WYOMING
Leroy Mitchell, Distributor
(Serving the Rocky Mountain States and Canada)

Prestressed Concrete Adapted To Many Structural Uses

by Fred E. Koebel*

A RELATIVELY new material, prestressed concrete, is coming more and more to the forefront in the construction industry. Successfully used in Europe for more than two decades, it is finally becoming recognized by engineers and contractors in the United States.

THERE are many systems of prestressing used today, both "pretensioning" and "posttensioning." The most common are the Freyssinet and Magnel-Blaton systems among the posttensioning systems, and the Hoyer system among the pretensioning systems.

All methods of prestressing utilize a very high-strength concrete and high-tensile-strength steel wires. The concrete used must have properly graded aggregates, a low-water cement ratio, and must be thoroughly vibrated with highspeed vibration before it can fully develop its compressive strength.

Concrete is inherently an excellent material in compression. Its tensile strength, however, is very small. This inability to take tension is detrimental in flexural members and is compensated for by placing steel on the tensile side of the member. The concrete, however, still cracks on this side of the beam although it satisfactorily resists the external bending moments.

In prestressed concrete the section is subjected to a precompression before application of the loads, and this precompression must be overcome before the section can develop any bending tensile stresses. By doing this, the section of the beam is never in tension. This prevents any cracks from forming when the member is loaded with its designed load.

Prestressing also increases the concrete's resistance to shear and accompanying diagonal tension. Because of this it is not necessary to include the large webs heretofore so essential in concrete design. This in turn decreases dead load moment.

Concrete may be prestressed in two ways as mentioned previously. Posttensioning indicates that the steel is stressed after the concrete is poured and set to strength. This can be done by preventing bond between the wires and the concrete and using end bearing devices to transmit the load. The wires are pulled from the concrete using the end of the member as the bearing surface for the jack. Pretensioning indicates that the wires are stressed between abutments and then the concrete is poured around them. When the concrete has gained its strength, the wires are cut and the load is transmitted to the concrete by bond.

Applications of Prestressed Concrete

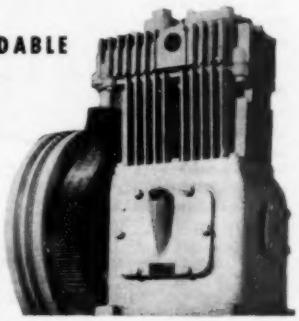
Prestressed concrete is a very versatile material. It has shown its versatility in the many ways that it has been used successfully throughout Europe. The variety of applications is truly great. Many monumental structures have been constructed from this material. In Europe it has shown itself to be competitive with reinforced concrete, wood, and steel construction; contracts having been granted in compe-

*Structural engineer, Southwest Research Institute, San Antonio, Tex.

SO MUCH DEPENDS ON IT!

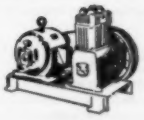
IN YOUR BUSINESS . . .

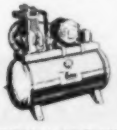
Quincy COMPRESSORS FOR DEPENDABLE COMPRESSED AIR SUPPLY



There is nothing more important to success than dependability. That's why hundreds of businesses employ Quincy Compressors to deliver the required compressed air supply for their various jobs. Modern, compact, and rugged . . . Quincy Compressors can be counted on when needed.

There's a Quincy Compressor for *your* job! Depend on a Quincy specialist to help you select the type and size (from 1 to 90 c.f.m.) to meet your specific needs.





FREE! NEW CATALOG

Complete with illustrations, features and specifications of entire Quincy line. Write Quincy Compressor Co., Dept. OG-6, Quincy, Illinois

QUINCY COMPRESSOR CO.

QUINCY, ILLINOIS

Branch Offices: NEW YORK • PHILADELPHIA • DETROIT • CHICAGO • ST. LOUIS • DALLAS • SAN FRANCISCO

Quincy Manufactures Air Compressors Exclusively

tition with these other materials. Many bridges and buildings have been constructed using prestressed concrete. It has shown itself applicable to factory casting of standard size members, such as beams, joists, railroad sleepers, and slabs.

Uses in Oil Industry

Prestressed concrete can easily be adapted for use in the oil industry. Of particular merit is the application to offshore structures. One primary example of its use is for offshore drilling platforms for drilling and stationary equipment. The platform could be a precast, prestressed flat slab, with prestressed concrete piles.

At least one major pile company is now making hollow-pile sections up to 36 in. in diameter, which have already proved successful. The piles are driven in the same manner as any other pile. Handling stresses, usually so critical in concrete, are of minor importance because of the magnitude of precompression introduced. The concrete is never cracked due to loads hence there is a high resistance to salt-water action on the steel. The piles are fireproof and are not subjected to the action of marine borers so common in wood piles. The piles are precast in a factory site and can be fabricated to any desired length. The slab used would also have the same advantages as the piles. The result of such construction would be a rigid, permanent structure, able to resist wind, impact, and wave action, with a marked degree of success.

Another use for prestressed concrete is the construction of tanks and pipes. Prestressing of sufficient magnitude is introduced to overcome the tensile stresses caused by the outward pressure of the water. Prestressing is applied in two directions, both vertically and circumferentially. The tank is completely watertight due to the prestressing. The same type of prestressing can be used for pipe-line construction. A 40-mile pressure pipe line, 36 in. in diameter with a 2-in. shell, designed for pressures up to 280 psi., is presently under construction in Canada.

Warehouses and buildings are another natural application of prestressing. Spans of great lengths can be obtained using the material. This fact allows for large unobstructed floor areas for storage. More recent advances in the design theories of prestressing now enables the design to include continuous and rigid frame type structures.

The Southwest Research Institute has designed and is presently building a prestressed flat slab for use with the Youtz-Slick method of building construction. In this method of construction, the slabs for the roof and floors are formed and poured on a base slab and then lifted into place, thus making prestressing a fairly simple operation. This slab is stressed in two directions, mutually perpendicular. A model study was made and analyzed before the large slab was started.

There are many more applications not mentioned. The initial stage in the development is complete and has met with success. There are many disadvantages still to be overcome, but with the basic conceptions thoroughly established, prestressed concrete stands on the threshold of universal acceptance.

FOR
LONG, TOUGH LIFE
Maintain Equipment
WITH
VICTOR
HARD-FACING
ALLOYS

VICTORALLOY
for
tools subject to abrasion and severe impact
TYPICAL APPLICATIONS
Tractor rollers and idlers; dredge pumps and cutters; bucket lips and teeth; rock crushers; steel mill wobblers; sheepsfoot tampers; etc.
Electric AC

VICTOR TUNGSMOOTH
for
thin and smooth cutting edges
TYPICAL APPLICATIONS
Hand shovels; coal cutter bits; auger points; shredder knives; screw conveyors; pug mill blades; ensilage knives; plow shares; drill bits; etc.
Gas and Electric AC-DC

VICTORTUBE
for severe abrasion
TYPICAL APPLICATIONS
Bulldozer tips; grader blades; scarifier teeth; posthole augers; ditcher teeth; oil drilling bits; pug mill knives; asphalt mixer blades; etc.
Gas and Electric AC-DC

VICTOR Hard-Facing Alloys give you faster application, smooth deposits, longer wear. Order from your VICTOR dealer TODAY.

Write for NEW DESCRIPTIVE LITERATURE

VICTOR EQUIPMENT COMPANY

3821 Santa Fe Ave. LOS ANGELES 58
844 Folsom Street SAN FRANCISCO 7
1312 W. Lake St. CHICAGO 7

Oil Firm Aids Inventors—Offers Help and Facilities

An oil company is making a portion of its extensive research laboratory available to the public for the study, development and proving-out of ideas. The plan provides the necessary technical facilities and skilled personnel to any one with an accepted idea, so he can bring that idea from the roughest scratch-pad stage to final pilot-plant testing. The inventor later may sell his idea elsewhere, or make some arrangement with the oil company, as he wishes. By thus encouraging inventors, the company hopes to remove a difficult roadblock to progress.

What's NEW

In Perforating, Testing, and Fishing Tool Services

McCULLOUGH
NEW SERVICES • NEW TOOLS
NEW WAYS OF DOING THINGS

Latest News About New Tools, Techniques and Services

New Glass Jet Perforators

SOLVE

Production Problems

— After all other methods fail to get results!

EXCERPTS FROM RECENT McCULLOUGH FIELD REPORTS

PRODUCTION PROBLEMS	SOLUTION
1. NEW WELL, POOR PRODUCER. Well only produced 6 B/D after being perforated several times by other types of perforators. One string of 5½" 15# casing heavily cemented. Operator about to abandon well.	Production increased from 6 B/D to 90 B/D with McCullough Glass Jet Perforator and Steel Strip Carrier. Due to these results oil operator planning to reperforate five other wells in same area with same history, and with the McCullough Glass Jet Perforator, of course.
2. DOG LEG. Operator pulled derrick in while running pipe, dropped casing causing dog leg at around 7,000'. Solid type perforators could not pass through kinked section. 5½" 17# casing, full of 11.5# mud, cemented.	McCullough Glass Jet Perforator and Steel Strip Carrier, although same O.D. as other perforators, easily passed through dog leg bringing in exceptionally good well.
3. SLOTTED CASING. Well had been washed several times without increasing production of 26 B/D through 5½" 17# slotted casing.	McCullough Glass Jet Perforator and Steel Strip Carrier increased production from 26 B/D to 59 B/D.
4. SHOT WITH NITRO. Well previously shot with nitro. Production of 250 B/D comparable to other wells in same area also shot with nitro. Open formation, hard sand.	McCullough Glass Jet Perforator and Steel Strip Carrier increased production from 250 B/D to 1004 B/D.
5. NEW WELL, NO PRODUCTION. Perforated several times by other types of bullet and largest jet perforators without results. 5½" 15# casing, squeeze cemented several times.	Combination McCullough Glass Jet Perforator and Steel Strip Carrier and McCullough Burrless Bullet Perforator. Production of 37 B/D obtained.
6. DRILL PIPE. Operator used 4½" drill pipe instead of casing. Other types of jet perforators carried such light loads of explosives maximum penetration could not be achieved.	McCullough Glass Jet Perforator and Steel Strip Carrier obtained same maximum penetration and maximum hole size as normally obtained only in regular sizes of casing. Result: A good gas well.

IT PAYS TO DISCUSS YOUR PRODUCTION PROBLEMS WITH A McCULLOUGH SERVICE ENGINEER. It pays in more ways than one, because perforating is not simply a matter of shooting holes. Every oil well represents a different perforating problem—a challenge.

McCullough Tool Company has the tools, equipment and servicemen to meet the challenge—more sizes and more different types of perforators, the latest in electronic control equipment, and service anywhere—anytime.

But the end result is what you are interested in—MORE B/D. Consistently good results—maximum production—is what you get with McCullough Perforating Service—the hardest shooting perforators in the world!

CALL YOUR McCULLOUGH SERVICE ENGINEER TODAY

PERFORATING, TESTING AND FISHING SERVICE ANYWHERE — ANYTIME!

McCULLOUGH TOOL COMPANY

5820 South Alameda Street, Los Angeles 58, California

405 McCarty Street (P. O. Box 2575) • Houston, Texas

EXPORT OFFICE: Los Angeles, California

CANADA: Edmonton, Alberta; Calgary, Alberta; Regina, Saskatchewan
VENEZUELA: United Oilwell Service Co., S.A.; Caracas, Anaco, Maracaibo

SERVICE LOCATIONS: **TEXAS:** Houston, Snyder, Alice, Cisco, Corpus Christi, McAllen, Odessa, Tyler, San Angelo, Victoria, Wichita Falls. **OKLAHOMA:** Oklahoma City, Guymon, Healdton. **MISSISSIPPI:** Laurel. **NEW MEXICO:** Hobbs. **KANSAS:** Great Bend. **WYOMING:** Casper. **CALIFORNIA:** Los Angeles, Avenal, Bakersfield, Ventura. **LOUISIANA:** Houma, Lake Charles, New Iberia, Shreveport. **COLORADO:** Sterling. **NORTH DAKOTA:** Williston. **UTAH:** Vernal.

ALKYLATION UNITS of Cities Service' Lake Charles plant are designated by arrows in this photo.

How Control of Alkylate Quality Affects Aviation-Gasoline Yield

Gulf Coast plant of Cities Service develops index for alkylate quality

by Norman N. Feller* and Roy M. France*

THE ultimate yield of aviation gasoline is controlled by the limiting specifications which is usually octane. Consequently, improving this characteristic on any component will increase aviation gasoline and, inasmuch as alkylate is the major component, the maximum benefit can be obtained from this source.

With this in mind commercial tests have been conducted over an extended period of time to develop an index for measuring alkylate quality. Results indicate that the principal factor involved for any specific olefin is internal isobutane to olefin ratio.

Correlations have been developed between this factor and antiknock ratings of propylene, butylene, and dimer alkylates.

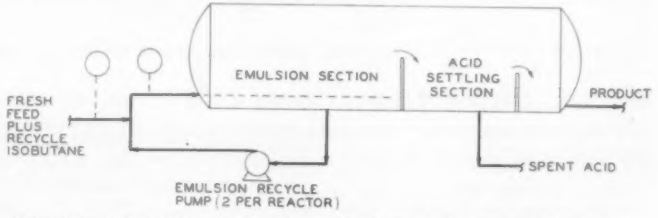
Reactor . . . Fig. 1 is a drawing of the horizontal jet-type Kellogg reactor used at Lake Charles. Fresh feed plus recycle enters the reaction zone and the contents of this section are in turn recycled to maintain a high concentration of isobutane in the emulsion. At point "A" the ratio of isobutane to olefin varies in plant operations from 5:1 up to 9:1. This is termed external ratio. At point "B," however, the emulsion recycle has increased the isobutane ratio to a value in the range of 60:1 to 200:1 and at this point is termed internal ratio.

*Cities Service Refining Corp., Lake Charles, La.

Internal Ratio Correlation

Frequent attempts have been made to correlate alkylate quality with external ratio. The use of this makes it impossible to compare different reactors or even to compare the same reactor at varying olefin feed levels. Too, plant operations have shown poor correlation between the external and internal ratio. This is due principally to variation of olefin feed rates, as well as purity of isobutane in the recycle streams. The present correlations have therefore been based on internal ratio.

Current alkylation plants are being built with external ratios as low as 3.5:1. Various means have been used to increase the concentration of isobutane per volume of olefin at the injection point. Principal among these is the practice of dividing the reaction zone into two or more compartments



ALKYLATION REACTOR of Kellogg horizontal jet type used at Lake Charles (Fig. 1).

The Revolutionary NEW GRIP-STRUT Safety GRATING

gives MAXIMUM STRENGTH with MINIMUM WEIGHT

NOT welded. Vertical members joined by integral saddles to form a positive NON-SKID surface under *all* conditions. In one single unit, GRIP-STRUT Safety Grating combines great strength with light weight, its side channel members greatly reduce cost of construction and simplify installation. Easy to maintain and clean. Replaces old or obsolete types of grating. Grip-Strut has a lower cost factor than any other type of grating. Available in steel or aluminum.

GLOBE GRIP-STRUT **GRIP-STRUT division**
THE GLOBE COMPANY
4016 S. Princeton Ave. Chicago 9, Illinois

A Better Strainer! —by DAVIS

— with BOLTED CAP

Bolted cap construction is used in sizes from 1½" to 12".

If you think all strainers are alike, ASK THE MAN WHO HAS TO GET INTO THEM! Davis builds strainers with bolted caps (instead of threaded caps) because numerous engineers have asked for them. It's easier to remove bolts than to try to unscrew a large thread cap after a strainer has been in use. Also makes possible locating blow-off at lowest point; no sediment pocket. Don't confuse Davis precision-made strainers with ordinary pipe fittings. Available in wide choice of types for steam, air, gas, or fluids. Semi-steel, bronze, or steel bodies; screwed or flanged. Pressures to 1500 p.s.i. Brass, stainless or monel trim. Ask for bulletin 100-A.

DAVIS REGULATOR COMPANY

2543 South Washtenaw Ave., Chicago, Ill.

GOODALL

Quality, Long Wear, Comfort

. . . *in* CLOTHING, BOOTS

Quality is plainly evident in every detail — materials, workmanship, appearance.

Long wear assures real economy — extra time between replacements, regardless of rough use.

Comfort is another reason why Goodall clothing and footwear are so popular with refinery men on every job throughout the plant.

COATS, JACKETS, OVERALLS . . .

A variety of styles, in rubber or neoprene, designed to meet all work requirements with maximum satisfaction to the wearer. Quality construction throughout, with refinements in detail that assure extra value.

GLOVES . . .

For plant and laboratory service. Made of high grade rubber or Vinylite, and shaped to provide comfort without awkwardness. Several styles in all regular sizes.

"TOE-SAVER" ® BOOTS . . .

The last word in protective footwear — famous for durability and the positive protection assured by the flanged steel safety toe box, tested to withstand 2000 lbs. pressure. Grid-tread soles provide extra wear and guard against slipping on wet surfaces. Short, three-quarter and full-hip lengths.

Contact Our Nearest Branch for Complete Information and Prices.

GOODALL RUBBER COMPANY

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.

Branches: Philadelphia · New York · Boston · Pittsburgh · Chicago · Detroit · St. Paul · Los Angeles · San Francisco · Seattle · Portland · Salt Lake City · Denver · Houston · Distributors in Other Principal Cities

Est. 1870

Gulf Coast Alkylation Plants

DUE to the present high demand for aviation gasoline, economical production of maximum quantities of this material is very important.

The heart of an aviation gasoline blend is the "alkylate." This material is so called because it is formed by means of an alkylation reaction in which isobutane is reacted with butylenes (usually) or other olefins. The resulting product fulfills the necessary requirements of an aviation gasoline base stock.

A large portion of the nation's alkylation facilities are located along the Gulf Coast. Total capacity in this area is in excess of 64,000 bbl. daily. Capacities for the individual plants are given in the table below:

Company and location—	Capacity bbl./day
Cities Service Refining Corp., Lake Charles, La.	7,500
Continental Oil Co., Lake Charles, La.	1,600
Eastern States Petroleum Co., Inc., Houston	2,200
Esso Standard Oil Co., Baton Rouge, La.	10,500
Gulf Oil Corp., Port Arthur, Tex.	4,000
Humble Oil & Refining Co., Baytown, Tex.	1,730
Magnolia Petroleum Co., Beaumont, Tex.	4,500
Pan American Refining Co., Texas City, Texas.	4,000
Pan-Am Southern Corp., Destrehan, La.	2,500
Phillips Oil Co., Sweeny, Tex.	2,500
Pure Oil Co., Nederland, Tex.	2,000
Shell Oil Co., Deer Park, Tex.	4,000
Shell Oil Co., Norco, La.	1,250
Sinclair Refining Co., Corpus Christi, Tex.	1,700
Sinclair Refining Co., Houston	2,400
The Texas Co., Port Arthur, Tex.	12,000
Total	64,380

FEEDSTOCK for alkylation units is obtained from this catalytic cracking unit at Lake Charles.

and injecting isobutane through them in series. This can be accomplished with the reactor shown in Fig. 1 by installing a weir through the middle of the reaction section to make two separate reaction zones. Calculations show that the over-all internal ratio would be raised only about 8 per cent, all other factors being the same. The cost of conversion and revising the feed system entailed such a long payout period that the conversion could not be justified.

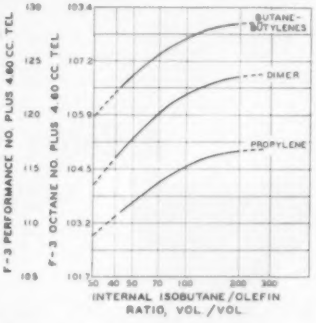
Fig. 2 shows the effect of diluting reactor feed with inerts, i.e., n-butane and propane, and therefore, changing the concentration of isobutane in the reactor effluent but maintaining the same olefin feed rate. An upper limit of about 75 per cent isobutane purity is generally fixed by investment and operating costs for distillation facilities. A lower limit of about 50 per cent isobutane purity is fixed by alkylate quality in the horizontal jet-type reactor being considered.

As can readily be seen, there is an economic point beyond which the cost of increasing the concentration of isobutane in the emulsion stream cannot be justified by increase in octane and yield, reduction of acid consumption, etc. Most alkylation plants are designed to yield an effluent stream containing between 50 and 75 volume per cent isobutane.

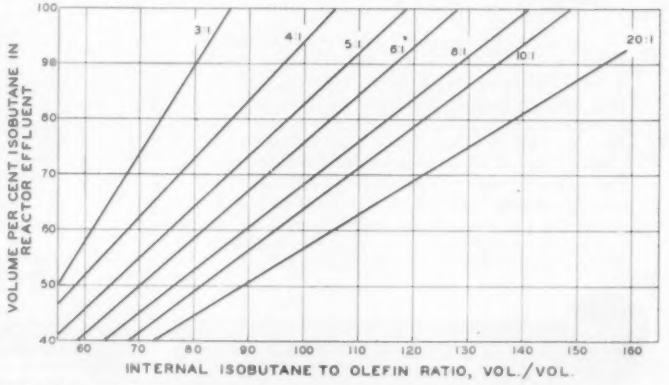
Operating Data

Assuming an average purity of 64 per cent, Fig. 2 shows a 5:1 external ratio with an 80:1 internal ratio at normal throughput rates. As isobutane purity, which reflects distillation efficiency, is varied over the operating range of 50 to 75 per cent, the external ratio moves from less than 4:1 to over 9:1 while the internal remains unchanged over the range. In similar fashion the curves show that a 5:1 external ratio at 75 per cent purity is better than a 20:1 external ratio at 50 per cent purity.

Fig. 3 shows the effect of internal ratio on F-3 octane at maximum lead level. The catalytic butanes-butylenes stream consists of a mixture of isobutane, normal butane, normal butylene, and isobutylene. The normal butylene



EFFECT OF internal ratio on F-3 performance number (Fig. 3).

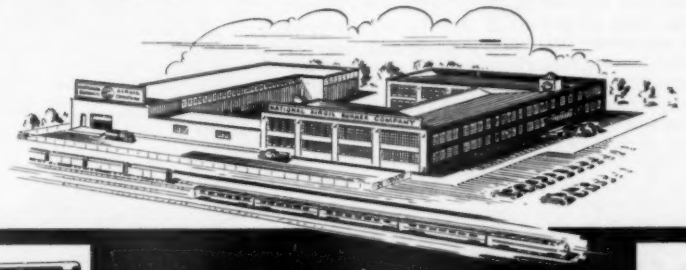


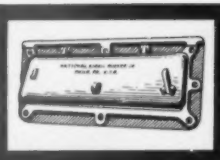
RELATION BETWEEN external ratio, internal ratio, and isobutane purity at fixed production. Parameter is external ratio (Fig. 2).

A Complete Line of

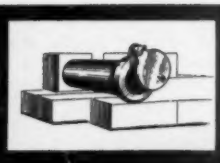
COMBUSTION ACCESSORIES

FOR EVERY INDUSTRIAL LIQUID FUEL—GAS INSTALLATION



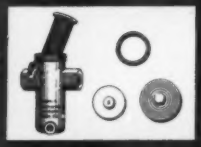


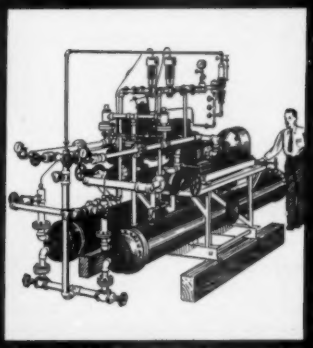
Air Control Door and Frame, top hinged, ratchet type, heavy duty, for manual control. Surfaces are machined to a close fit.



Ignition Port with Refractory Tile No. N896 . . . for use with standard 3" pipe. Also serves as a peephole

Fuel Oil Suction Strainer, single type. Large basket area insures low pressure drop. Cover and basket easily removed for cleaning.

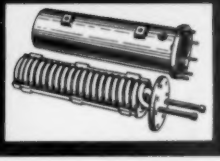




Fuel Oil Pumping and Heating Unit . . . Twin or Single Pumps. Steam driven. Electric driven or combination Steam-Electric with Single or Double Fuel Oil Heaters and accessories for feeding oil at constant pressure and temperature.

Furnace Relief and Access Door, heavy construction, gradually air tight. Door latching correctly weighted, lined with plastic refractory retained by imbedded grill, with observation port and cover.

Wide-View Peephole, safety, curtain type. Cobalt glass removed to show bearing surface for curtain. Curtain halves are interlocked—open simultaneously.



Fuel Oil Heater, Self-Cleaning, Spiral Coil Type. High oil velocity in coil, resultant turbulence prevents carbon formation. No internal connections or joints.

. . . yes, just as we are proud of supplying the *right* liquid fuel or gas burning equipment (over 40 years experience throughout industry), so, also, are we proud of our full line of highest quality accessories to supplement your every combustion need. Within our modern, "daylight" factory, salesrooms and general offices NATIONAL AIROIL likes and adheres to the phrase, "nothing but the best"! We believe that our record speaks for itself . . . i.e.; the "right combination" for you in achieving maximum combustion economy is: NATIONAL AIROIL Fuel Oil, Gas or Combination Oil & Gas Burning Equipment; NATIONAL AIROIL Combustion Accessories; and, NATIONAL AIROIL Engineering Consultation.

May we be of help to you in accomplishing your particular installation or in solving that difficult problem?

CHEMICAL-PETROLEUM DIVISION

NATIONAL AIROIL BURNER CO., INC.

1236 EAST SEDGLEY AVE., PHILADELPHIA 34, PA.
Southwestern Division: 2512 South Boulevard, Houston 6, Texas
INDUSTRIAL OIL BURNERS, GAS BURNERS FURNACE EQUIPMENT

concentration averages 35 volume per cent and the isobutylene 16 volume per cent. In commercial operation slight variations in the ratio of the two unsaturated compounds have had no noticeable effect on either F-3 or F-4 rating.

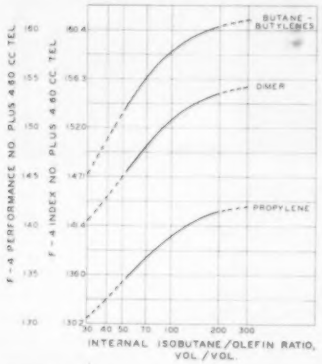
The curve marked dimer is the butanes-butylenes stream described above after removal of normal butylene and polymerization of isobutylene to the corresponding C_8 hydrocarbon di-isobutylene. In actual practice the C_8 and heavier portion averages about 75 per cent dimer and 25 per cent trimer and higher polymers.

The propylene curve is for 100 per cent purity propylene.

Due to inadequate facilities for accurately measuring heavy alkylate yield, the variation of percentage 338° end point aviation material in the crude alkylate with internal ratio could not be definitely fixed. As would be expected all indications were that the yield increases directly with the ratio.

Both the F-3 and F-4 correlations are based on reactor temperatures of 45° F. to 70° F. for the propylene alkylate and 45° to 60° F. on the dimer-butylene alkylates. Reactor temperature on dimer-butylene alkylation appears to be significant to the extent of less than 0.5 performance number over the 45° to 60° F. range. No effect on propylene-alkylate octane could be detected between 45° and 70° F.

Fig. 4 shows the effect of internal



EFFECT OF internal ratio on F-4 performance number (Fig. 4).

ratio on F-4 rating at the maximum 4.60 cc. per gallon lead level. Inspection of the propylene alkylate curve shows that propylene is an unsatisfactory feed stock for production of 115/145 grade aviation gasoline. However, its better than necessary F-3 octane will allow blending with highly aromatic agents or dimer-butylene alkylate to meet the F-4 specification and still satisfy F-3.

TABLE 1—LEAN AND RICH-MIXTURE RATINGS OF PROPYLENE, BUTYLENE, AND DIMER ALKYLATE

Isobutane to Olefin ratio	Propylene		Dimer		Butylene	
	F-3 O.N.	F-4 I.N.	F-3 O.N.	F-4 I.N.	F-3 O.N.	F-4 I.N.
50:1	103.7	135.1	105.2	147.1	106.8	153.3
100:1	104.6	140.2	106.3	152.5	107.7	158.4
200:1	105.0	143.2	106.8	155.2	108.1	160.7

TABLE 2—FINISHED AVIATION GASOLINE PER BARREL OF ALKYLATE

	Grade 100/130			Grade 115/145		
	50:1	100:1	200:1	50:1	100:1	200:1
Propylene	1.33	1.43	1.47			
Dimer				1.15	1.31	1.36
Butylene				1.32	1.40	1.46

TABLE 3—TYPICAL INSPECTION OF COMPONENTS AND FINISHED AVIATION BLENDS

	Light naphtha	Propylene alkylate	Dimer-butylene alkylate	Grade 100/130	Grade 115/145
Distillation:					
I.b.p., °F.	114	143	145	110	106
10° F.	150	174	180	146	143
30° F.	180	186	201	176	178
50° F.	202	196	213	202	207
70° F.	222	206	228	212	223
90° F.	252	239	259	245	250
E.p., °F.	294	338	335	334	335
Residue, per cent	98	98	98	98	98
Loss, per cent	1	1	1	1	1
Freezing point		—76	—76	—76	—76
B.t.u. constant				10,700	11,600
Lead content, cc/gal.	4.6			4.6	4.57
Knock rating					
F-3 octane	91			101.6	105.0
F-4 performance No.	87			130	145
Sulfur				0.03	0.03
R.v.p., psig.	7.0	3.5	3.0	7.0	6.8
Water tolerance	0.0	0.0	0.0	0.0	0.0
Gum content					
Existent	<0.5	<0.5	<0.5	<0.5	<0.5
Accelerated	<0.5	<0.5	<0.5	<0.5	<0.5
Precipitated	<0.5	<0.5	<0.5	<0.5	<0.6
Bromine No.	<0.5	<0.5	<0.5	<0.5	<0.5

Components . . . There are several compounds other than alkylate that are utilized in preparing aviation gasoline. Since the quantity of aviation gasoline produced is a function of the chemical composition, it is necessary to specify the components employed. Where maximum production is desired, there are four classes of compounds used: paraffins, naphthenes, aromatics, and olefins. As production is decreased, aromatics are removed because of their high cost and olefins because they promote gum formation and have relatively poor lean-mixture ratings.

The present aviation-gasoline demand can be supplied by the petroleum industry with two classes of hydrocarbons: paraffins and naphthenes. For this reason, alkylate produced at different isobutane to olefin ratios was blended with a straightrun light naphtha and isopentane to prepare the finished aviation gasoline. Table 1 shows a comparison of the isobutane to olefin ratio versus antiknock characteristics of the alkylates used in this study.

Propylene alkylate was used exclusively in Grade 100/130 and dimer-butylene alkylate in Grade 115/145 aviation. Octanes were adjusted by the addition of a 300° F. end-point straightrun light naphtha with a lean mixture rating of 91 and a rich-mixture blending index number of 76. Reid vapor pressure was blended to maximum with 96 per cent purity isopentane. Octanes used throughout are with maximum tetraethyl lead of 4.60 cc. per gallon. The finished blends completely satisfy all specifications.

A barrel of propylene alkylate produced at 50:1, 100:1, and 200:1 ratio is equivalent to 1.33, 1.43, and 1.49 bbl. of Grade 100/130 aviation gasoline, respectively. In going from 50:1 to 100:1 production was increased 7.5 per cent whereas the increase from 50:1 to 200:1 amounted to 10.5 per cent. Today's price structure shows that earnings are increased 16 cents per barrel of propylene alkylate by increasing the ratio to 100:1.

Table 2 shows the aviation gasoline that is obtainable per barrel of alkylate. In every case the improvement in quality at higher ratios increased production of aviation gasoline. The most noticeable change occurred as ratio was increased from 50:1 to 100:1 which incidentally is within the operating

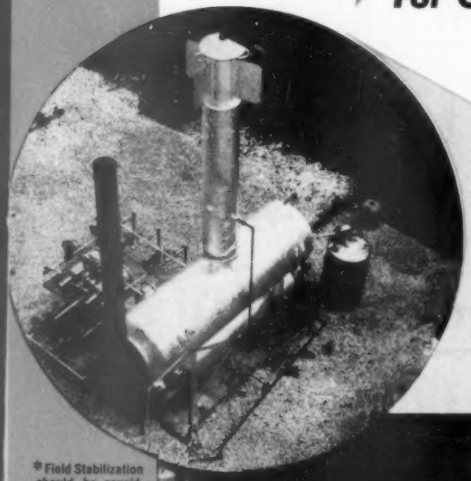
(Continued on page 367)

✓ CHECK

BS&B GLYCOL INJECTION

Low Temperature Separation System

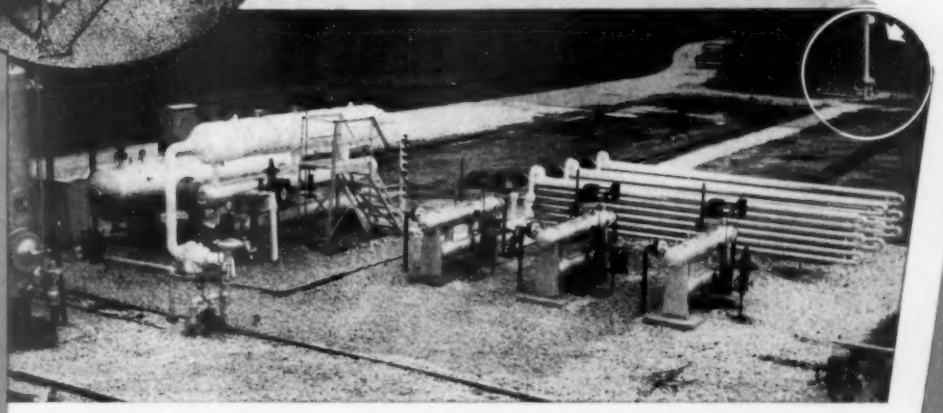
✓ **For Lower Temperature** ✓ **For Higher Recovery**
✓ **For Greater Application** ✓ **For Longer Life**



Glycol injection prevents the formation of hydrates. This allows the use of a regenerative heat exchanger which cools the gas to temperatures well below the hydrate point ahead of the expansion valve. With a given pressure drop available and consequently a fixed temperature drop across the expansion valve, lower separator temperatures are obtained than are possible even with conventional LTS units, where temperatures above the hydrate point must be maintained in the system up to the expansion valve.

In the BS&B Glycol Injection System condensate is discharged from the low temperature separator to a Stabilizer* or to a low pressure separator for partial stabilization before going to storage. The glycol flows to a reconcentrator to be returned later to the system by means of a pump. The cold high-pressure gas passes in heat exchange with the well stream and then to sales.

*Field Stabilization should be considered for use with all low temperature separation systems.



Profit-Wise Advantages of BS&B Glycol Injection System

1. Applicable to one well, or can be used to combine a number of wells for low temperature separation.
2. All equipment is standard design (full salvage value) and can be tied in and adapted to equipment already on the lease.
3. The BS&B Glycol Injection process can be applied to any well stream having allowable expansion of 500 P.S.I. or more.
4. Process will yield dehydrated gas to pipeline specifications with less expansion than regular LTS units.
5. Cold liquid allows use of a simple inexpensive lease stabilizer.
6. Glycol injection has complete versatility for offshore or in-swamp use . . . as a central plant for scattered properties or in a wellhead package.
7. Wellhead heaters can be eliminated in nearly every case.
8. Installed costs for small plants are in line with the conventional types of low temperature systems. *They are much lower in cost for large central plants, due to use of standard separator design.*

BS&B . . . for 60 years a leader in oil and gas producing and refining equipment . . . also manufacturers of Climax Controls, Safety Devices and special fabricated pressure vessels. There's one of BS&B's 33 Branches or 13 Sales Offices near you if you're in the Oil Country. Let us give you a complete and descriptive bulletin on the BS&B Glycol Injection System. Ask your BS&B MAN or write . . .

EFFICIENCY BS&B RELIABILITY

BLACK, SIVALLS & BRYSON, INC.

OIL & GAS EQUIPMENT DIVISION, DEPT. I-A6

2131 Westwood Blvd. Oklahoma City, Oklahoma

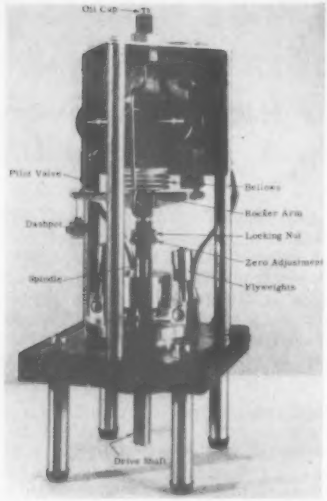


Fig. 1—Pneumatic speed transmitter.

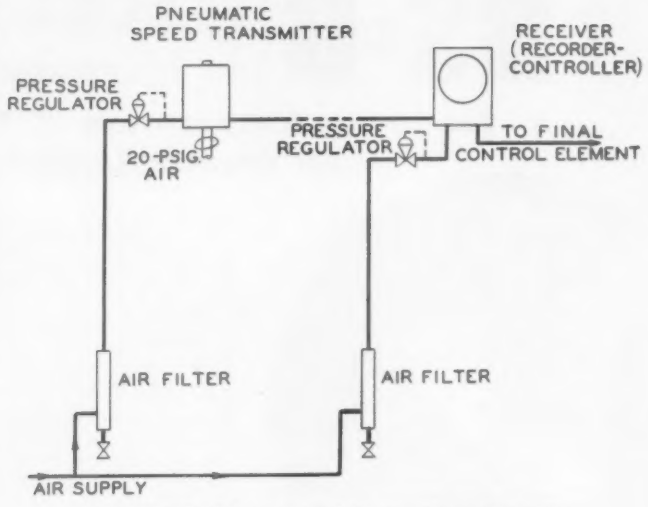


Fig. 2—Schematic piping arrangement for pneumatic speed transmitter.

Improved Speed Control . . .

. . . with pneumatic transmitter, for cat blower, compressor, other refinery applications, at Shell's Houston refinery

by Charles E. Salter, Jr.,* and Marx Isaacs*

A NEW pneumatic speed transmitter, designed by Shell Development Co. is currently in use in five installations at the Shell Oil Co., Houston refinery, Deer Park, Tex. Satisfactory experience in these installations has prompted 13 additional applications to be made in the near future.

Conventional mechanical and hydraulic devices, although suitable for many refinery speed-control applications, do not have the range and facility of adjustment often required in control functions. In comparison with pneumatic controllers in similar applications, conventional governor adjustments are coarse, uncalibrated, of limited range and, in many installations, inaccessible. The pneumatic speed transmitter described here was developed after an investigation of the characteristics of mechanical and hydraulic governors. Testing of a variety of governors that could link the engine and controller resulted in the development of the pneumatic speed transmitter. This transmitter is marketed by the Taylor Instrument Cos.

*Shell Oil Co., Houston refinery, Deer Park, Tex.

How the Transmitter Operates

The mechanical - pneumatic device functions by converting speed of rotation into an air signal proportional to the square of the speed. The force-balance principle is utilized (see Fig. 1).

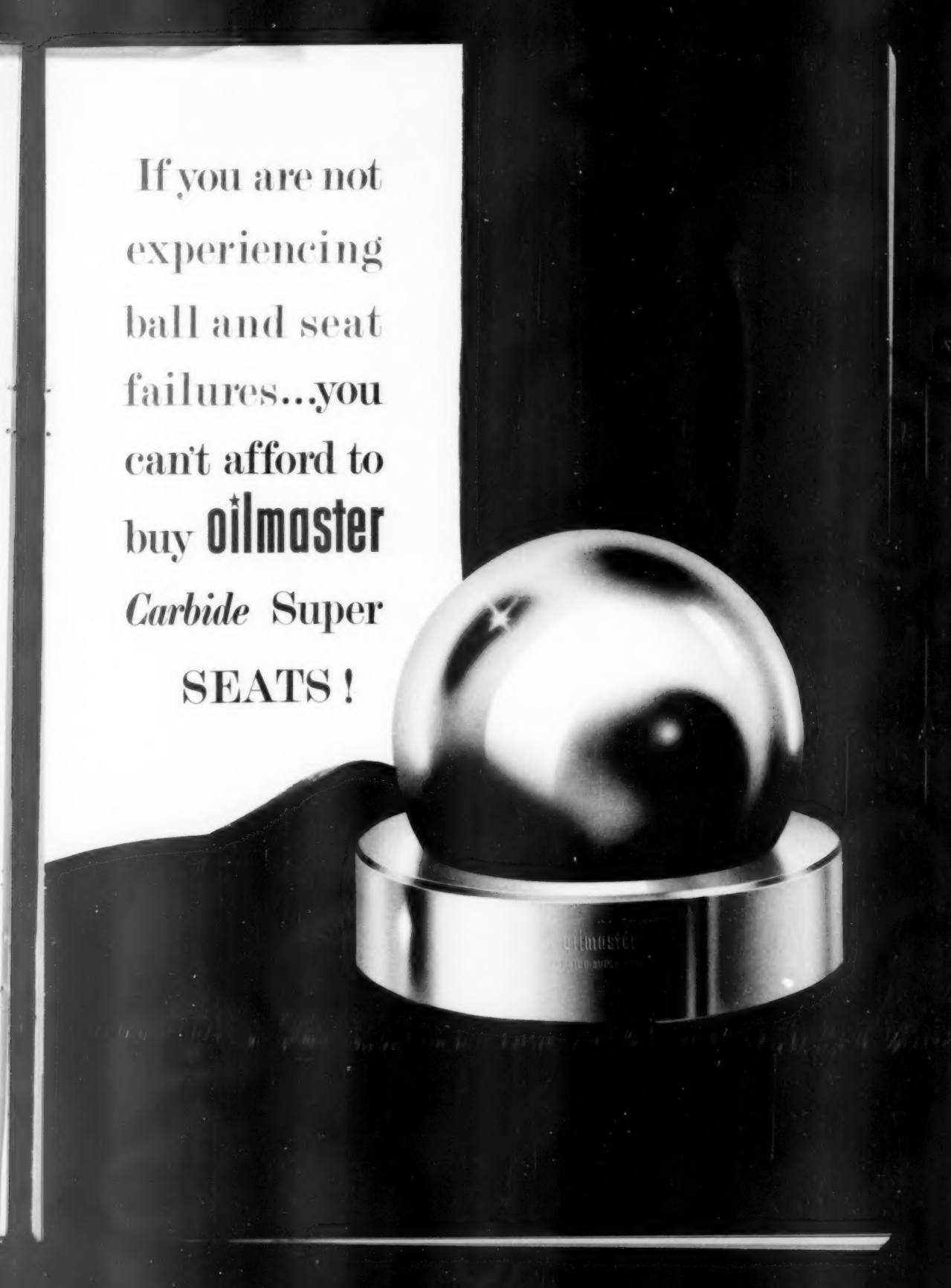
The transmitter's flyweights are connected to a rotating table which is secured through a gear box to the drive shaft of the prime mower subjected to speed control. The gearing is used to obtain the 200-1,600 r.p.m. shaft speed required by the transmitter. The centrifugal force exerted by the flyweights is transmitted to a vertical spindle (not rotating) by means of a small thrust bearing. The spindle in turn conveys this force to a rocker arm, through a yoke at the top of the spindle. The rocker air operates the pilot valve which allows air to enter or leave the bellows, which balances the upward force of the vertical spindle. The pressure in the bellows is, therefore, proportional to the centrifugal force exerted by the flyweights, thus setting the output air pressure of the speed transmitter.

Provisions are made for adjusting the minimum and maximum output air pressures to correspond with zero and maximum speeds, respectively, for the particular installation.

In speed-control application, the pneumatic transmitter is normally connected to a standard pneumatic process controller having the conventional control actions: adjustable proportional, reset, and rate responses. The output from the controller operates the throttle valve or other control mechanism of the prime mover to which the transmitter is attached. The speed as set on the process controller is maintained thereafter, regardless of normal load changes on the prime mover. Schematic piping arrangement is shown in Fig. 2.

Refinery Applications

Propane compressor . . . The propane compressor at the lube oils deasphalting plant is a Worthington 135-hp. horizontal, two-stage, steam-driven unit. During the startup of this plant, operating loads were subject to sudden changes and failures of the mechanical pump governor to maintain control resulted in serious upsets. To provide a better control of speed, a pneumatic


If you are not experiencing ball and seat failures...you can't afford to buy oilmaster *Carbide* Super SEATS!

oilmaster
PUMPS
FOREMOST IN THE INDUSTRY

If you are having ball & seat failures you can't afford not to buy...

oilmaster
Carbide Super
SEATS!

Write for Descriptive Literature

Fluid Packed Pump Company

MAIN OFFICE AND PLANT, LOS NIETOS, CALIFORNIA

Distributed by The National Supply Co., Pittsburgh, Pa. · Export: The National Supply Co. Inc. Export Division, 600 Fifth Avenue, New York

Co-Distributors: Berry Supply Store, Beacon Supply Co., Industrial Supply Co.

speed transmitter and control equipment were installed.

The installation consists of: (1) a 200 r.p.m. speed transmitter, (2) a Brown indicating receiver - controller with limit stops, (3) a Brown recorder, (4) a Moore valve-positioner, and (5) a 2-in. Fisher control valve.

This speed controller has required no maintenance and has given good service. The installation is shown in Fig. 3.

Boiler fans . . . The induced and forced-draft fans on one of the 650-psi. boilers are in tandem with an 800-hp. Elliot turbine drive. The turbine was originally provided with a mechanical flyball governor which directly operated the steam valve to maintain the design speed of 3,600 r.p.m. Control of the induced draft of the boiler was effected by operating the induced-draft fan damper. The forced-draft fan damper was controlled by the air flow meter. These controls were integrated into the complete Bailey boiler-control system.

Tests conducted by manually throttling the turbine speed until the induced-draft fan damper was wide open indicated a substantial saving in steam was possible when the boiler operated at reduced loads. A system utilizing the pneumatic speed transmitter was designed to speed control the turbine drive with the control point set by the induced draft of the boiler. The minimum speed at which the turbine can be operated with adequate lubrication insured is 2,200 r.p.m. For boiler loads lighter than this, damper control is again employed, with the turbine run at constant speed.

Inert gas vacuum pump . . . A steam-driven Worthington type BSV single-stage horizontal vacuum pump is employed in the inert gas system of the lube-oil clay contact plant to hold a vacuum on the Oliver filter. The pressure drop across the filter, and consequently the load on the vacuum pump, is determined by the buildup of clay on the filter drum. Variations in this coating result in severe load changes on the vacuum pump with the result that on light loads the pump overspeeds and shuts down. The mechanical flyball governor was unable to cope with these sudden load changes.

The performance of a pneumatic speed transmitter has been excellent in this service since it has eliminated operating upsets due to overspeed and tripout of the machine and has required no maintenance.

Catalytic cracking blowers . . . These air blowers are operated at constant speed, driven by 2,460-hp. 5,300-r.p.m. Worthington turbines. The machines were originally equipped with Moore flyweight-actuated oil relay-type governors which provided only throttling-type control action. Load changes consequently resulted in speed changes and manual compensation was necessary. Because of this factor, along with the difficulty in making adjustments to the governor during operations and severe wear in the governor mechanical linkages, it was decided to install a pneumatic speed transmitter on each of the two turbines. (Fig. 4).

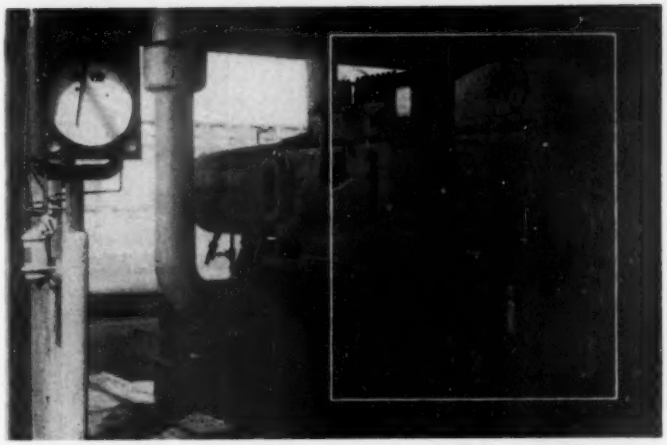


Fig. 3—Speed transmitter installation on deasphalting unit propane compressor.

THE AUTHORS

C. E. SALTER, JR.

MARX ISAACS

Charles E. Salter, Jr., is engaged in instrument engineering at Shell Oil Co.'s Houston refinery with which company he has been associated since 1947. He is a graduate in mechanical engineering, having attended Georgia Tech.

Marx Isaacs is with the technological department of Shell's Houston plant, following several years at Shell's Norco refinery in Louisiana, where he was engaged in laboratory, plant, and technological work. His principal duties now are the writing and editing of technical reports.

Use of these devices permits a tighter control of turbine speed; consequently, it is possible to turn the machines at a higher speed without danger of overspeeding and shutdown on sudden load changes. Checks with the turbine manufacturer revealed the turbines could be operated at slightly higher speeds provided precautions were taken against overspeeding on load changes. By making certain other changes to the turbines and running the machines at 5,500 r.p.m., it is possible to obtain an additional 400 hp. each.

Advantages of Using Pneumatic Speed Transmitters

1. All control functions (throttling range, reset and rate action) are available and accessible and are continu-

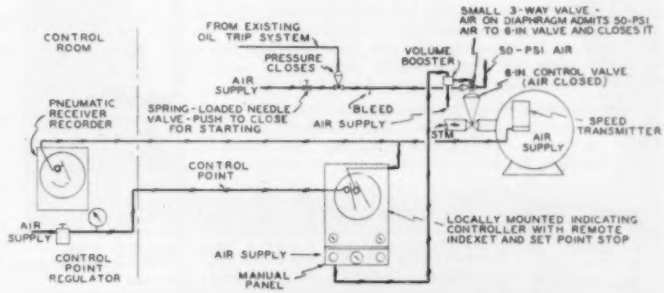
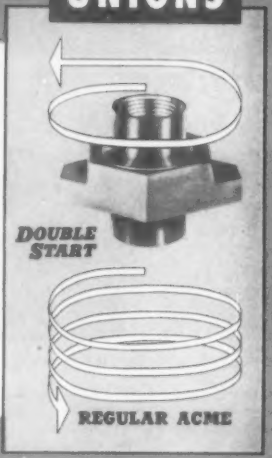


Fig. 4—Speed control of catalytic cracking unit blower turbines.

IT'S FAST... IT'S NEW...
another CATAWISSA FIRST!
NEW SPEED FOR PIPING INSTALLATIONS
280% FASTER OPENING AND CLOSING
CATAWISSA DOUBLE START PERFECT SEAL UNIONS
WILL NOT LOOSEN UNDER VIBRATION
1¼ TURNS OF THE NUT TO MAKE UP!
instead of
3½ turns of regular nut threads
ACME THREAD


2 START POSITIONS
NOW YOU CAN HAVE THE NEW SPEED OF DOUBLE-START THREADS IN ANY 2" TO 4" ACME THREAD CATAWISSA PERFECT SEAL UNION!
PERFECT SEAL SEATS
Catawissa now offers you the PLUS FEATURE of 280% faster nut opening and closing for all piping installations where you use Acme thread unions!
Customary fumbling for starting thread is virtually eliminated—Catawissa DOUBLE-START UNIONS have TWO Acme thread starting positions (instead of one) with the same holding qualities, the same ability to hold tight under vibration as regular Acme thread unions—the threads are Acme, the thread form is the same.
See them at your favorite supply store, place your order now—just specify DOUBLE-START THREADS on any 2" to 4" Acme thread Catawissa PERFECT SEAL UNION of the lug or hex nut type! (Smaller sizes on special order).
NO LOSS IN HOLDING QUALITIES
SEE OUR CATALOG IN THE COMPOSITE CATALOG
WRITE FOR DATA SHEET D-S-1
CATAWISSA VALVE & FITTINGS CO.
450 MILL STREET ★ CATAWISSA, PENNA.

ously variable, permitting closer control of machine speed.

2. Pneumatic systems are more familiar to plant operators, consequently are easier to understand and operate.

3. Mechanical linkages with their accompanying lost motion and friction are eliminated.

4. The engine governor is separated from the safety devices, making each more dependable and allowing more flexibility in maintenance without shutdown.

5. An accurate speed record or indication is available at all times.

Acknowledgments

To Shell Development Co. for extensive work in this field.

To P. R. Hoyt and B. D. Stanton of Shell Development Co. for aid in pneumatic speed transmitter installations at Shell's Houston refinery.

Reference

1. "Instrumentation as Applied to Speed Control" by J. G. Wilson, H. M. Karr, and M. V. Long (Shell Development Co.), presented at second annual short course on instrumentation for process industries, Texas A. & M., August 1947.

Production Problems in Water Areas in Louisiana

(Continued from page 228)

a barge only recently constructed. It measures 88 by 30 by 10 ft. The well-service barge is designed so that it is capable of moving in very shallow water, and it is used for such work as pulling 10,000 ft. of 2½-in tubing, abandoning wells, and swabbing. The increased cost of gas-lift operations, swabbing operations, rig-rental rates, and dredging to go to the wells to perform the work, was the reason this barge was designed. However, the primary purpose of the barge is for swabbing. It is not the intention to have this barge perform workover operations other than pulling tubing.

Initially, the barge has been performing operations in this ratio: swabbing 95 per cent of the time; pulling tubing 3 per cent of the time; plugging and abandoning wells 2 per cent of the time. These percentages change from time to time, and within a matter of 2 years it is quite likely that the ratio will be swabbing 50 per cent of the time, pulling tubing 40 per cent, plugging and abandoning wells 10 per cent. It can be seen that flexibility is a necessary and a desirable feature in this design. Of course, flexibility costs money.

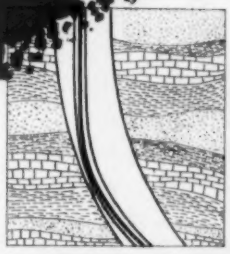
The need for a barge of this type can be shown, for example, by Gulf's

olves of pr ucing the problem Crooked Holes

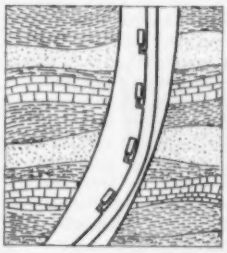
Actually, there is no problem when you produce crooked holes with GOT Gas Lift because, with this most modern of all artificial lifting equipment, all holes look alike, whether they're crooked or straight, deep or shallow.

GOT Gas Lift costs less to buy and install; maintenance costs are negligible; lifting costs per barrel of oil are always low. Equally important is the fact that GOT Gas Lift equipment never becomes obsolete because of changing well conditions: The same valves that produce crooked holes can be used in straight ones, shallow ones or deep ones.

Get the full story on the **economical** method of artificial lift from your GOT representative, or write for our latest Gas Lift Catalog.



Attempting to pump crooked holes results in continuous wear and replacement of rods, tubing and pumps. Maintenance and equipment costs are often prohibitive.



With GOT Gas Lift, there's nothing moving inside the tubing except your production, and the gas which is carrying it to the surface. Wear on the equipment is no greater than it would be if the hole was perfectly vertical.

got

Are You Pumping . . .

Garrett Oil Tools, Inc.

P. O. BOX 6115 HOUSTON 6, TEXAS

Manufacturers and distributors of the world's most complete line of gas lift valves

Orleans Levee District "A" No. 5, in Quarantine Bay field, which would require $12,000 dredging expense before it would be possible to move in a rig to plug and abandon the well. The well-service barge would be able to move on location without dredging, effecting a savings of $12,000.

Paraffin barge . . . A large part of the wire-line work for land operations is handled by contract. In water areas company personnel scrape paraffin, run bottom-hole pressures, pull storm chokes, etc. A Battis steamer is mounted on this barge to steam paraffin flow lines. The removal of paraffin deposits in the tubing and flow lines constitutes a large item of expense.

Artificial lift . . . This problem has been under constant study for a number of years. In water areas the problem of obtaining platforms to support equipment to lift the oil is a costly one. The conclusion has been reached that the most practical type of lift for water operations is gas lift, if gas is available.

Generally speaking, the wells in the delta area lend themselves readily to gas lifting. High fluid level and water-drive reservoirs are the rule, rather than the exception. The control of sand and parrafin, and the need to handle large volumes of fluid, are the factors to be considered when selecting the type of lift.

Tubing perforations have been used successfully in two instances. This is simply an intermediate step before the installation of flow valves.

Treating . . . The treating problems, generally, are not too complicated. Successful operations have been obtained with the heater-treater and the gun barrel-heater combination. Fig. 8 shows a heater-treater installation at Quarantine Bay. To provide floor space for the gun-barrel heater costs $15 per square foot, and walkways cost $20 per linear foot.

A heater-treater installation at Grand Bay shown in Fig. 9, is used in conjunction with a submersible tank-battery barge.

A later development in foundations for treating equipment is the concrete platform discussed earlier. One such unit is in operation at Battery No. 4 in the Quarantine Bay field. Several different royalty interests had to be considered at this location, and this was accomplished by using individual heater-treaters. Cost per square foot of the concrete platform and the cost per foot of the steel walkway is about the same as the cost for the wooden structures.

Corrosion . . . Corrosion is a tough and costly problem—not only corrosion encountered in the well, but, even more, that encountered on surface equipment, barges, pumps, flow lines, fittings, etc. Painting, replacing flow lines, replacing fittings, etc., are continuous tasks and represent a cost that is difficult to determine accurately.

Radio communication . . . In the past, one of the most difficult problems encountered in offshore operations has been communication. Communication with fields and rigs has been established by marine radios of the ship-to-shore type. A great deal of shutdown time was experienced in the past and delays as high as 4 to 6 hours were encountered because of inadequate communication. In fact, in many cases time was saved by having personnel travel by boat and personally deliver the information, rather than wait for a connection through the marine radio.

An F.M. system was installed May 11, 1950. This network consists of 11 base stations and 22 mobile units. The mobile units are mounted in automobiles, boats, and at drilling rigs. It would be difficult to calculate a payout for this system due to the intangible

S&R Custom Built

PORTABLE TELESCOPING POLE MASTS

This S&R double ladder mast is of heavy welded steel construction, and is fabricated of 10¾" pipe and 8⅝" pipe. Overall dimensions when erected 87 feet to crown support beam and 52 feet when telescoped in traveling position.

Approximate weight of the complete equipment is 12,000 lbs.

The complete assembly includes the (1) poles, (2) breakdown shaft assembly, (3) attached racking platform (which positions itself when poles are raised), (4) pole adjusting screws, (5) a sheave assembly to be mounted on truck or trailer for raising the poles, (6) and a four or five 24 inch sheave crown block for ⅞" line.

Available for truck, trailer, or skid mount . . . or for your barge, and in 87', 65' and 55' sizes.

For additional information write, wire, or phone.

S&R TOOL AND SUPPLY CO.

P. O. Box 1755 155 McCarty

Houston 1, Texas

Export: 42 Broadway, N. Y. 4, N. Y.

benefits received because of this greatly improved communication system. Specifically, however, shutdown time on rigs has been reduced, movement of material has been expedited, better supervision of rigs has resulted, and production operations have been coordinated.

Maintenance of waterways . . . The Mississippi River deposits an average of 2,000,000 tons of silt a day in the delta area. Gulf goes to great expense to remove part of this silt. This is accomplished by a hydraulic dredge at $840 per day or a dragline at $15 per hour, the latter being very limited in its scope of operation.

The Gulf canal system consists of 100 miles of canals. In Grand Bay a detailed study was undertaken and plans made leading toward control of the silting problem. In this field there is a total of 25.4 miles of canal.

Dredging is an important factor in workover operations. Frequently, it costs as much or more to dredge a canal to a well in order to be able to move in the workover rig as it costs to perform the remedial work. There is the hope of reducing this dredging cost by utilizing the shallow-draft well-service barge discussed earlier.

Planning ahead for workover operations in order to insure that the channels leading to these wells are navigable is most difficult because of changing tides, currents, and varying river levels. On Lease 1369, Well No. 1, at Timbalier Bay it was necessary to redredge the canal before the rig could be moved off the location after drilling was completed. This occurrence is not uncommon in West Bay field. There have been some cases, such as at Lease 1369, when a dredge, after cutting a channel to a location, had to dredge its own way out because of rapid silting.

Grand Bay and West Bay pose the greatest problems from the silting standpoint. Originally, these fields were more or less land fields, and the maintenance cost of the canals was low. As the fields developed, larger canal systems were established, and this system eventually joined the bay. When communication with the bay was made in each of these fields, the maintenance cost of the canal systems skyrocketed.

Control of Alkylate Quality

(Continued from page 358)

range of most sulfuric acid alkylation units. Although the quality was improved at ratios above 100:1, the operation cannot be justified on a quantity-quality basis. This data was included for its theoretical value and possible usefulness in the event of a national emergency when demand for Grade 115/145 would be increased.

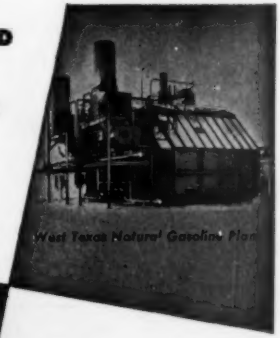
The dimer alkylate produced at a 50:1 ratio will not satisfy rich-mixture ratings. This was corrected by substituting normal butane for isopentane to satisfy the vapor pressure requirement.

Table 3 presents a typical inspection for each component and finished aviation gasoline Grades 100/130 and 115/145. As expected, the F-3 ratings were better than specifications and production limited by the F-4 rating. Although it is not desirable to adjust these ratings under today's conditions, it could be accomplished by utilizing a small amount of aromatics or a first-pass catalytic base stock with a corresponding increase in production. As previously mentioned, all specifications were satisfied by the finished blends.

The fundamental purpose of improving quality of aviation components is either to increase production or improve engine performance. When aviation-gasoline requirements are high during periods of national emergency, it is especially desirable and necessary that production be increased to the maximum. Under peacetime operations the consumer may take advantage of better-quality fuels by increasing pay loads and extending cruising range.

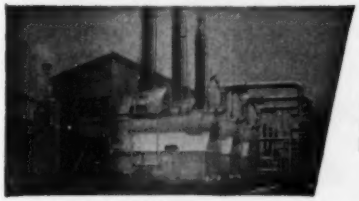
WICKES

STEAM GENERATORS SPEED PROCESSING AND CUT COSTS IN REFINERIES AND NATURAL GASOLINE PLANTS



West Texas Natural Gasoline Plant

Central Texas Natural Gasoline Plant



Louisiana Refinery

Indiana Installation

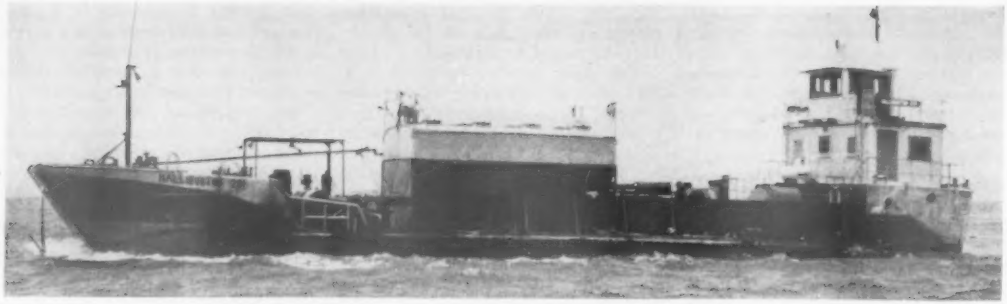
The Wickes Type A Steam Generator is proving itself one of the most serviceable boiler units employed by the oil and gas industry. Wickes can fill your exact requirements for boilers of any type up to 250,000 lbs. steam per hour and 850 p.s.i. Wickes service facilities are world-wide and our knowledge of steam generation is available to you without obligation. Write for descriptive literature on the famous Wickes line of steam generators.

WICKES

THE WICKES BOILER CO. Saginaw, Mich.
Division of THE WICKES CORPORATION
RECOGNIZED QUALITY SINCE 1854

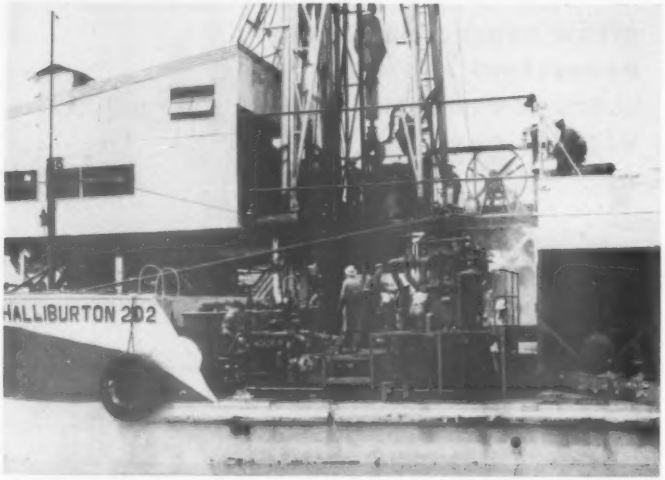
SALES OFFICES: Atlanta • Boston • Chicago • Cincinnati • Denver • Detroit • Houston • Indianapolis • Los Angeles • Milwaukee • New York City • Pittsburgh • Saginaw • San Francisco • San Jose • Springfield • Seattle • St. Louis • Tulsa • Mexico City • Buenos Aires • Manila • Havana • Montevideo • San Juan, P.R. • Victoria, B.C.

134



SELF-PROPELLED cementing vessel en route to site of drilling operations.

Sea-Going Cementing Service



MARINE CEMENTING VESSEL in operation at rig. Note swinging boom discharge line from vessel to rig floor.

For Wells in Open Waters

Here's a description of the fleet that provides this unusual drilling service

by Francis X. deBlanc*

SINCE 1947, when the first cementing boat was put in operation by Halliburton Oil Well Cementing Co.'s base at Harvey, La., the fleet has now increased to the following: Howco 101, bulk cement carrier; Howco Boats 201 through 205 (converted LCT's); Howco Barges 401 and 402, and Howco Boats 502 and 503 (speedboats). The following is a brief description of the boats and barges employed in this unusual type of oil-field service.

Howco 101 is an all-welded barge of 160-ft. length, 34-ft. breadth, 10-ft. 6-in. depth, capable of hauling 20,000 sacks of bulk cement. This cement is handled by screw conveyor using self-generated electrical power. The generator set is driven by 165-hp. 6-71 General Motors diesel generating 60-kva. 60-cycle, 3-phase, 220-volt a.c. power. It is also equipped to handle various admix cements. The 101 supplies the other boats with cement, admixes, acid, and chemicals for mud cleanout agent jobs. Galley and quarter facilities are for a 10-man crew.

The 101 is towed into New Orleans, Mobile, Baton Rouge, or elsewhere as necessary to load cement direct from the cement mill. This barge at present is docked at the mouth of the Mississippi River and supplies materials to the four boats operating in that area.

Howco 201, a converted LCT, has an over-all length of 120 ft., beam of 32 ft., average draft of 3½ ft. It is propelled by three screws driven by same number of 165-hp. G.M. marine diesel engines. It also has two 20-kw. d.c. generator sets, generating auxiliary power for boat. Located aft is the pilot house and quarters for a seven-man crew. The crew consists of a cementer, captain, engineer, three cement drivers, and a cook. Since this boat was originally put into commission, the cementing equipment has been remodeled. It is now equipped with three Howco T-10 pumps driven by General Motors 6-71, 165-hp. diesel engines with torque convertors and five-speed transmissions. One pump has 4½-in. plungers and the other two are equipped with 4-in. plungers.

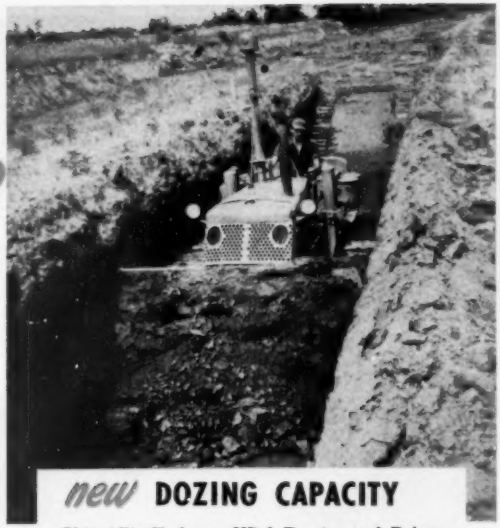
45 Sacks per Minute

The unit is capable of mixing and pumping cement at the rate of approximately 45 sacks per minute. The boat has a bulk storage of 2,000 sacks which is handled by screw conveyor driven by electric motors. Discharge pressure of these power driven pumps is rated at 10,000 psi. each. Also located forward is auxiliary equipment, including a 40-bbl. measuring tank, mixing hopper, and cementing tub. This boat carries 3,000 gal. of water and 3,000 gal. of fuel, enabling it to operate away from the base as much as a week at a time.

Howco 202 and 203, also converted LCT's, are similar to Howco 201 with the exception of the cementing equip-

*Halliburton Oil Well Cementing Co., Harvey, La.

ALLIS-CHALMERS BRINGS *new* *performance* TO THE OIL FIELDS



new DOZING CAPACITY

This Allis-Chalmers HD-9 Tractor and Baker 9X No-Push-Beam Dozer put new speed into slush pit digging. A revolutionary bulldozer, the 9X blade is mounted directly to the tractor main frame — no push beams needed. Main frame and dozer raise and lower as a unit. Almost 1,150 lb. lighter than standard dozer, the 9X keeps tractor center of gravity intact . . . reduces wear on front truck wheels and support rollers . . . costs less to buy. Dozer has 8-ft. highway wide blade — no transport permit needed.

new CRAWLER TRACTORS

Allis-Chalmers offers the newest, finest tractor line on earth for oil field users — for bulldozer, scraper, winch, side boom and front-end shovel work . . . any heavy pulling, pushing, excavating, loading or lifting jobs. Each Allis-Chalmers crawler gives you a new yardstick for rating tractors . . . each sets new standards in its class for performance, durability, servicing and operating ease.

SPECIFICATIONS

Model	Engine	Hp.	Weight	Speeds Forward	Speeds Reverse
HD-20	GM 2-Cycle Diesel	175 (net engine)	41,000 lb.	0 to 3 and 0 to 7 mph.	0 to 5.5 mph. standard
HD-15	GM 2-Cycle Diesel	109 (drawbar)	27,850 lb.	6 speeds to 5.8 mph.	3 speeds to 4.5 mph.
HD-9	GM 2-Cycle Diesel	72 (drawbar)	18,800 lb.	6 speeds to 5.7 mph.	3 speeds to 4.4 mph.
HD-5	GM 2-Cycle Diesel	40 (drawbar)	44-in. tread 10,500 lb.	5 speeds to 5.5 mph.	1 speed to 2.0 mph.

new MOTOR GRADERS

There's a *right* machine for your job in the complete line of five Allis-Chalmers motor graders from the big, new, powerful AD-40 to the efficient, low-cost Model D — for building and maintaining haul roads, tank farm lands, parking lots and yards.

• Model AD-40 grading a road.

SPECIFICATIONS

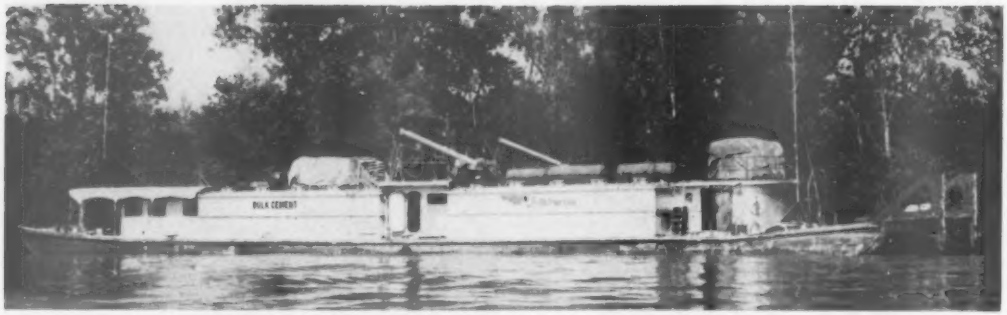
Model	Engine	Brake Hp.	Weight	Speeds Forward	Speeds Reverse
AD-40	GM 2-Cycle Diesel	104	23,000 lb.	6 speeds — to 16.6 mph.	3 speeds — to 6.1 mph.
AD-30	GM 2-Cycle Diesel	78	22,700 lb.	6 speeds — to 16.6 mph.	3 speeds — to 6.1 mph.
BD-3	GM 2-Cycle Diesel	78	19,042 lb.	6 speeds — to 15.6 mph.	3 speeds — to 5.7 mph.
BD-2	GM 2-Cycle Diesel	50.5	17,772 lb.	6 speeds — to 14.7 mph.	3 speeds — to 5.4 mph.
D	A-C Gasoline	34.7	8,500 lb.	4 speeds — to 18.6 mph.	1 speed — to 2.9 mph.

See your Allis-Chalmers distributor. Let him show you how Allis-Chalmers NEW POWER is bringing new performance to the oil fields.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

• DESIGNED FOR YOUR JOBS • EASY TO OPERATE
• BUILT TO TAKE IT • EASY TO SERVICE

THE NEWEST, FINEST LINE ON EARTH



BULK CEMENT CARRIER and supply barge. Cement is discharged by screw conveyor.

Reilly
PROTECTIVE COATINGS
The water spray in the background was photographed during the blasting of a channel across the Tennessee River for a natural gas pipe line that is coated with Reilly Enamel.
Reilly Coatings give maximum protection to metal, tile, stone, concrete and cement surfaces under erosive, corrosive and atmospheric conditions of wear.
Reilly
PROTECTIVE COATINGS
REILLY TAR & CHEMICAL CORPORATION
MERCHANTS BANK BUILDING
INDIANAPOLIS 4, INDIANA

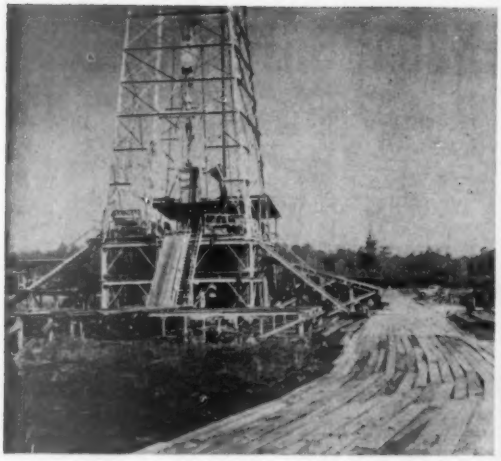
ment forward. The cementing equipment consists of two Howco vertical duplex double-acting piston-type pumps with 4-in. liners and 10-in. stroke, each driven by 4-71 100-hp. G.M. diesel engine through a torque convertor and a five-speed heavy-duty transmission; one Howco horizontal-type duplex double-acting 4 by 10-in. pump driven by 4-71 diesel engine through a four-speed transmission and four Howco S-12s, 12 by 4 by 12-in. duplex double-acting steam-driven piston pumps.

Discharge pressure of the two vertical power-driven pumps is rated at 8,500 psi. each. These pumps are capable of mixing and handling cement at the rate of approximately 40 sacks per minute. The four steam pumps located on starboard side of the bow can be compounded in line to operate above 9,000 psi. with 300 psi. steam pressure. They are for use only on steam rigs since no boiler facilities are provided on the boats. They are capable of mixing and pumping cement slurry into a well at a rate in excess of 40 sacks a minute. With two of them running in parallel, the unit is capable of handling fluid at 480 barrels per hour.

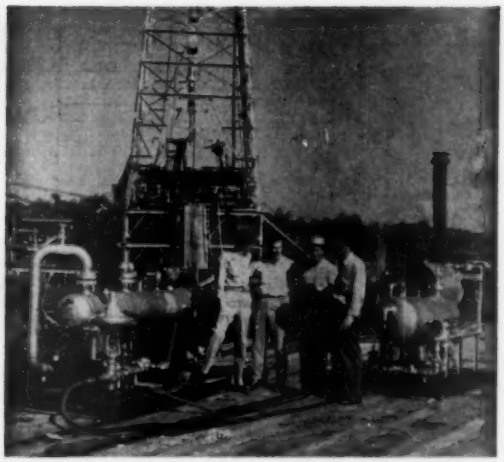
Howco 204 and 205 are identical to Howco 202 with the exception of the bulk cement equipment. These boats use an air-belt system for delivery of cement into cement hopper. Storage facilities are divided into eight 250-sack compartments that discharge into one main air belt and thence into hopper. Two blowers situated under storage tank provides low-pressure high-volume air for these belts. Belts are installed at a minimum of 7° angle and when air is induced under the belt, cement flows downward.

Flush-deck barges . . . Howco 401 is a flush-deck barge equipped with one double Howco skid unit, which includes two vertical pumps and one horizontal pump. The bulk-cement

(Continued on page 387)



DISCOVERY WELL of the new West Lake Long gas field, Terrebonne Parish, Louisiana, is Cities Service-Forest Oil Corp. 1 Delta Securities shown above. Contractor spent 45 days to build road to location, to construct bridge, and to rig up.



PORTABLE TEST EQUIPMENT employed in measuring gas flow at Cities Service-Forest Oil Corp. 1 Delta Securities. Supervising test are: J. N. Miles, D. R. Pressley, M. A. Reber, and J. P. Straight. Calculated open flow was 70,000 M.c.f. per day.

Persistence Pays Off . . .

Cities Service Oil Co. wildcat in Terrebonne Parish, Louisiana, opens deep field after four companies drill prospect in vain

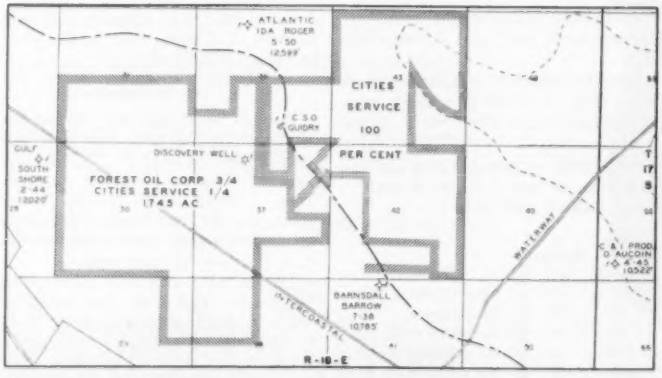
by Joseph A. Kornfeld
District Editor

WEST LAKE LONG FIELD, new gas reserve in Terrebonne Parish, Louisiana, climaxed the drilling of a series of five deep tests totaling 58,900 ft. of bore hole. The area lies in the Miocene trend of the extreme southern portion of the state. (See regional map.)

The discovery well is Cities Service Oil Co., operator, and Forest Oil Corp. 1 Delta Securities in C NE NW 37-17s-18e. It is situated 3½ miles northwest of Lake Long oil field and 5 miles east of Houma gas field.

On initial production test made March 31, 1952, the discovery well gaged 4,580 M.c.f. of gas per day through a 13/64-in. choke; separator recovery was 71.6 bbl. of 45° A.P.I. gravity distillate per day. Initial produced gas-distillate ratio was 63,900 cu. ft. per barrel. Tubing pressure was 5,090 psig.; the casing was sealed.

Open-flow gas capacity was calculated at 70,000 M.c.f. per day.



RINGED BY DRY HOLES is the new gas-distillate discovery of Cities Service Oil Co. and Forest Oil Corp. shown in the map of the new West Lake Long field of Terrebonne and Lafourche parishes, Louisiana.

History of Prospect

Back in July 1938, Barnsdall Oil Co. drilled the first test on the West Lake Long prospect. It was the 1 Barrow (see map) and was drilled to a total depth of 10,785 ft., where it was abandoned. This well lies 1½ miles southeast of the present discovery.

Second exploratory test was drilled on the west side of the prospect by Gulf Oil Corp. in February 1944. The 1 South Shore was dry at a total depth of 12,020 ft. Both of these wells were drilled in Terrebonne Parish.

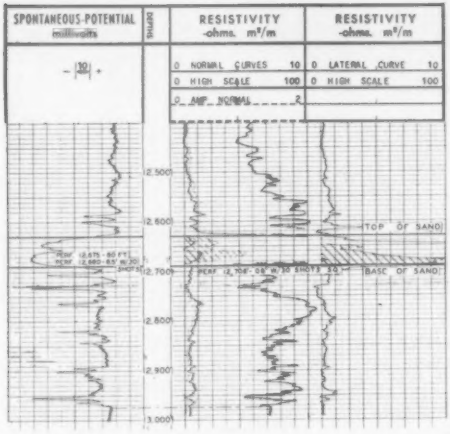
Three miles southeast of the new discovery, C. & I. Production Co. drilled 1 O. Aucoin, Lafourche Parish, to a total depth of 10,522 ft. in April 1945.

Fourth dry hole for the prospect was plugged in May 1950, only 1 mile north of the discovery well; it was Atlantic Refining Co. 1 Ida Roger, in Lafourche Parish. It went to 12,599 ft. without finding production.

Drilling Record

Loffland Brothers drilled the discovery well for Cities Service. Drilling commenced on January 14, 1952, following a period of 45 days utilized in laying board road, building bridge, and rigging up.

The 16-in. conductor pipe was set at



Pay section detail electric log of Cities Service Oil Co.-Forest Oil Corp. 1 Delta Securities. Mud resistivity is 0.3 ohms m²/m. at 184° F., B.H.T. Electrode spacings are AM = 16 in., A = 64 in., and AO = 18 ft. 8 in.

MIOCENE TREND of southern Louisiana, shown in shaded area, contains many major deep gas fields. Black dot indicates latest discovery—Cities Service-Forest Oil Corp. 1 Delta Securities well in Terrebonne Parish.

120 ft. Surface pipe was 10¾ in. which was set at 3,057 ft.

At a depth of 10,112 ft., water-base mud system was changed to a lime-base mud. At 11,700 ft. mud was changed to an oil-emulsion type; this reduced drilling time from 12 to 5.3 minutes per foot.

Structurally, the well logged 155 ft. higher at 12,440 ft. than the Atlantic deep dry hole 1 mile to the north.

Completion record . . . The 1 Delta Securities discovery was drilled to a total depth of 12,973 ft. An electric log was run to bottom which indicated a 12-ft. Miocene gas sand from 12,630-90 ft. Perforator gun was lowered and the well shot from 12,706-08 ft. with 16 bullets. These perforations were squeezed off with cement and the well was perforated from 12,680-85 ft. The first drill-stem test through these perforations failed.

The second drill-stem test was taken with packer set at 12,660 ft.; water cushion load of 6,000 ft. was used. Chokes were ¼-in. bottom-hole and ⅛-in. top-hole. The water cushion was recovered and the following pressures were developed:

100 psig. in 12.5 minutes; 3,000 psig. in 19 minutes; 4,000 psig. in 49 minutes; 4,750 psig. in 1 hour 24 minutes, and 5,175 psig. in 1 hour 47 minutes. A drill-pipe leak terminated the test.

Bottom-hole pressures were recorded as follows:

Initial flowing 4,560 psig., maximum flowing 6,640 psig., and shut-in 6,960 psig.

Final completion perforations were made from 12,675-80 ft. with 30 shots, or a density of six shots per foot. Initial completion was 70,000 M.c.f. of gas per day, calculated from open-flow tests. Condensate production is being trucked to the Texas Pipe Line Co.'s line near Houma, La.

TYPICAL CASING PROGRAM — WEST LAKE LONG FIELD, TERREBONNE AND LAFOURCHE PARISHES, LOUISIANA*

Item—	Size, in.	Setting depth, ft.
Conductor pipe	16	120
Surface casing	10¾	3,057
Long string	7	12,953
Tubing	2½	12,668

*Cities Service Oil Co.-Forest Oil Corp. 1 Delta Securities, Sec. 37-17s-18e, the discovery well.

ANALYSIS OF MIOCENE GAS-DISTILLATE RESERVOIRS, CITIES SERVICE OIL CO. AND FOREST OIL CORP. 1 DELTA SECURITIES, NE NW 37-17s-18e, WEST LAKE LONG FIELD, TERREBONNE PARISH, LOUISIANA

Top of sand	Base of sand	Gross sand thickness	Net gas sand	Remarks
10,720	10,740	20	10	Not produced
10,950	11,002	52	33	Not produced
11,324	11,409	85	35	Not produced
11,482	11,562	120	40	Not produced
12,020	12,120	100	25	Not produced
12,630	12,690	60	50	Produced through casing perforations 12,675-80; and from 12,680-85.

Joint-Interest Operation

The discovery well was drilled on a block of 1,745 acres, of which Cities Service owns one-fourth, and Forest Oil Corp. the remaining three-fourths interest.

First Offset Drilling

Cities Service also owns a large block of acreage adjoining the discovery well to the east; this block comprises portions of 36, 42, and 43-17s-18e. On this 100 per cent company-owned acreage, Cities Service is drilling at its 1 F. P. Guidry. The 16-in. conductor pipe was set at 121 ft. and the 10¾-in. surface pipe at 3,028 ft.

This offset has logged geological markers 13 ft. higher than the discovery at a depth of 10,939 ft.

Nearby Fields

Houma South oil field, which lies southwest of the new area, was discovered on November 13, 1938 by Shell Oil Co. on a seismic prospect. Their 1 Peters in 73-18s-18e, Terrebonne Parish, was completed through casing perforations from 10,305-10,308 ft. in a Lower Miocene sand.

Houma field proper, a gas-distillate area 5 miles west of the new discovery, was completed on December 25, 1944 by Union Oil Co. of California. Their 1 Guidry in 22-17s-17e was a gas-condensate well through casing perforations from 10,290-98 ft. in the Lower Miocene.

You'll find the block features you want...

in the

Baash-Ross

"DBM" MULTIPLEX!

Here—from the originators of modern unitized Block design—is a traveling-block-and-hook with really advanced design and performance features . . .

Ample Weight Adjustability – without adding loose parts or changing the streamlined contour. Pockets built into the MULTIPLEX can be filled with lead to meet weight requirements. Weight can be increased as much as 20% over unweighted Blocks–is easily removed whenever desired!

Space Saving Compactness – combines Block, Hook and Link Ears in one close-coupled unit that is both short and unusually narrow, (special narrow-width bearings–no spacer plates). Compare MULTIPLEX dimensions with *any other* Block-and-Hook of same capacity!

Rugged Body Construction – entire load carried on internal framework of heavy rolled steel plates. Outer shell is completely free of load stresses!

All-In-One Connector – self-locking Hook for swivel bail, locking type Link Ears for elevators, both in one spring-loaded unit that swivels full 360° or can be quickly locked in any of 8 equi-spaced positions!

Low Center of Gravity – assures proper balance while running, steadier Block travel, greater working efficiency!

Double-Row Tapered Bearings on *each* sheave carry full radial and thrust loads!

Individual Grease Ducts – machined into center pin, assure positive lubrication to each bearing from conveniently located external fittings!

Close-Fitting Guard prevents lines from jumping sheaves –also permits threading Block without removing guard. Or where lines are looped in rig, guard can be easily removed for reeving!

Completely Streamlined – even bolts, pins and grease fittings are fully recessed and protected!

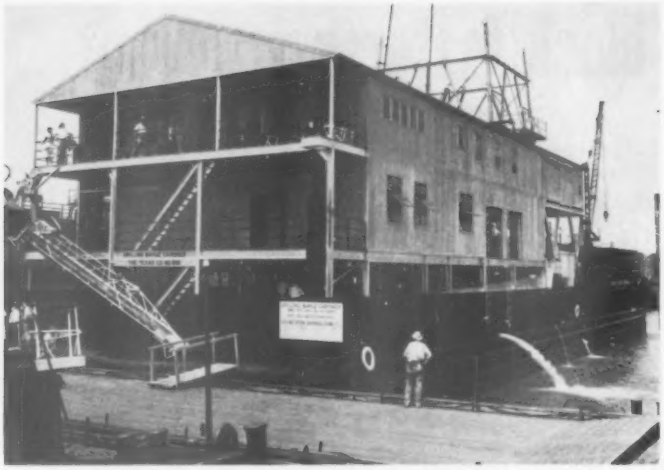
Available through leading supply stores

Baash-Ross

TOOL COMPANY *Our 32nd year*

GENERAL OFFICES: 5512 SO. BOYLE AVE., LOS ANGELES 58
OKLAHOMA CITY • HOUSTON 20 • ODESSA • CASPER
Export Offices: 11 W. 42nd St., New York 36

THE Baash-Ross MULTIPLEX *is available in a complete range of sizes to meet any drilling or production requirement. Write direct for complete details–or see your nearest Baash-Ross representative!*



View of The Texas Co.'s extra-heavy-duty drilling barge Gardner.

Texaco Unveils Its New Deep-Drilling Barge

This million-dollar plus unit is 170 ft. long and is engineered and equipped for 15,000-ft. drilling

by Walter Rose
District Editor

THE Texas Co. unveiled recently its extra-heavy-duty drilling barge Gardner, designated The Texas Co. No. 689, on May 10, 1952. This big drilling barge is engineered and equipped throughout for 15,000-ft. and deeper drilling. It is currently being used on a wildcat location in the Bay Tombour area of South Louisiana.

Principal dimensions of this new Texaco drilling unit, incorporating 20 years' operation of drilling barges by The Texas Co., are:

Length	170 ft.
Width	54 ft.
Depth	12 ft. 6 in.
Length of slot	80 ft.
Width of slot	10 ft.
Height of derrick floor	23 ft. 3 in.

Cost of complete barge and associated drilling equipment totals 1.25 million dollars.

Many innovations are found in the Gardner. Many recently developed construction materials are employed for the first time in a drilling barge—materials and items which should contribute to lowered maintenance and operating costs. Improved operations and operating conditions are secured—economically—by these selections.

General . . . The height of the derrick floor, 23 ft. 6 in. above the top of the hull or main deck, is immediately noted. This unusually high derrick floor provides readily for the largest and heaviest combination of blowout preventer equipment that should ever be required. The pipe rack or slot end of the barge is, in general, of orthodox design but material departures have been made in the design of the barge superstructure as well as the selection and placement of machinery and quarters on the power end of the barge.

On the main deck is located the pump room completely enclosed by seal wall with watertight doors. In the main pump room are located the two main drilling pumps, chain driven from the rig's compounding transmission on the engine room deck, and the independent engine-driven mud-mix pump. Two active mud pits are located crosswise of the hull at the forward end of the pump room.

The unique two-step construction of the drilling rig enables a very economical use of available space.

The design of the mud-piping system is such that in the event of a cut-out or failure in one line there is another line that can be used, thereby holding shutdown time to a minimum.

It will be noted that the deck of the barge slopes toward the center, rather than outboard, to facilitate draining waste oil into the slot where it can be trapped. This arrangement was originated and developed by Levingston Shipbuilding Co. to make it easy to conform with regulation of the Conservation Department concerning pollution.

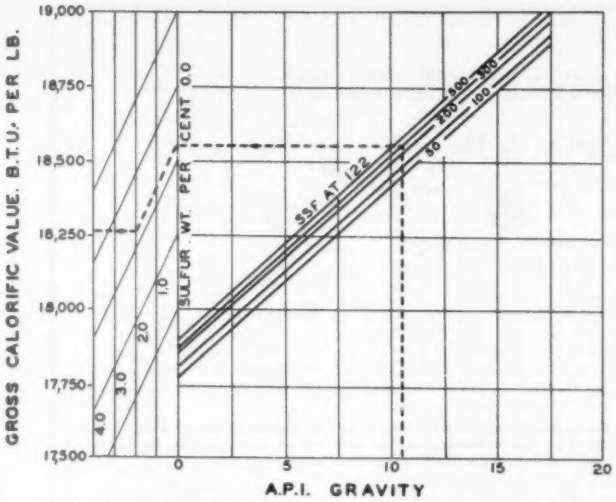
The Emsco J-1400 drilling rig, powered by three National-Superior PTDGS-8 supercharged dual-fuel diesel engines, with two National E-700 mud pumps, incorporates many special features assembled in a manner to permit the greatest flexibility and maximum performance possible with the power employed. A great many of the features of this rig are the direct result of suggestions made by the operating and engineering departments of The Texas Co., final assembly being the result of close cooperation between the drilling department of The Texas Co. and the manufacturers of the equipment.

The 6032 Dynamatic brake is equipped with extended shaft and a novel quill drive to the Oilwell Brantly drilling control which imposes the heavy chain pull of the Brantly directly on the frame of the Dynamatic brake.

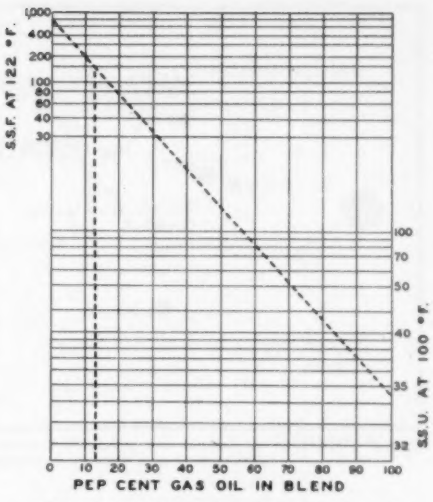
The Dynamatic electric couplings make their appearance for the first time in a submergible drilling barge. These couplings, with their independent heat-exchanger cooling systems, permit smooth and flexible utilization of the power from the three engines to the main drilling pumps and the draw works for rotating or hoisting.

The shaft-driven National SHS-20½ rotary machine is placed so that the top of the rotary machine guard is 5 in. above the derrick floor by supporting the right-angle gear box, which drives the rotary machine, on special supporting steel of the barge.

In the engine room, located approximately halfway between the compound transmission and the draw works, is the Emsco J-143-TS selective transmission, this placement of the selective transmission securing comparatively short chain drives from the compound transmission to it and from it to the draw works. This selective transmission gives six hoisting speeds and three rotary speeds.



HEAT OF COMBUSTION as function of A.P.I. gravity for Bunker C fuel oil (Fig. 1).

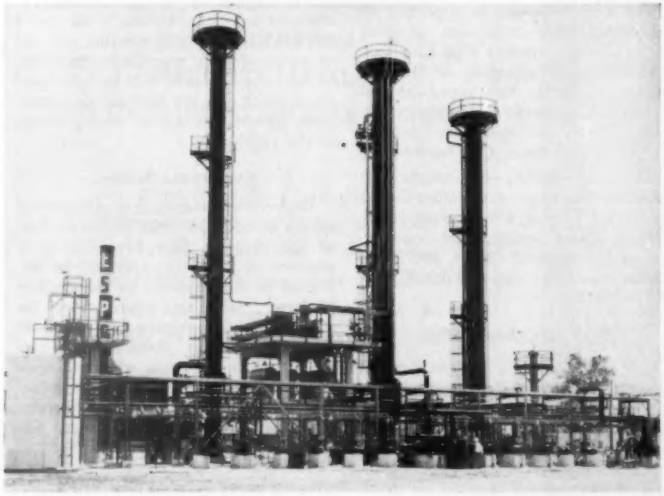


VISCOSITY BLENDING CHART for fuel oils (Fig. 2).

New Correlations for Fuel-Oil Properties

Here are helpful charts for those who burn Bunker C fuel oil and who do not have time and extensive laboratories for testing

by M. G. Boone*



NEW AROMATICS EXTRACTION unit recently placed on stream by Eastern States is first Udex unit to be built in the world.

EVALUATION of fuel-oil properties requires a considerable amount of time in the analytical laboratory. For this reason, correlations have been developed for determination of heats of combustion and blending characteristics of Bunker C fuel and reduced residuums.

Heat of Combustion

The calorific value or gross heat of combustion of a fuel is the number of B.t.u. liberated when 1 lb. of the material is burned and is determined in a standard calorimeter. This test requires about 3 hours to perform. For that reason a chart (Fig. 1) was developed to correlate heat of combustion with A.P.I. gravity. This correlation was also needed so that thermal cracking operations could be followed and fuel produced that would yield the highest calorific value possible.

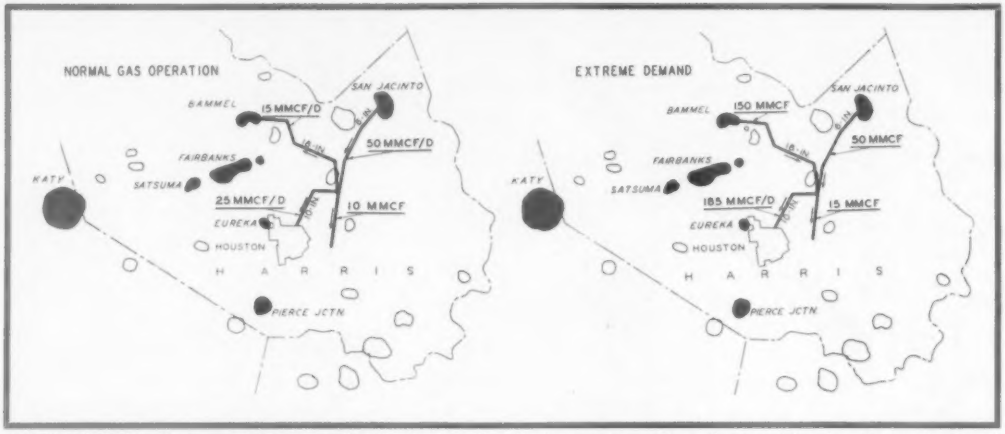
The tests ordinarily made on Bunker C fuel which indicate calorific value are gravity, A.P.I., Furol viscosity at 122° F., and weight per cent sulfur. The heat of combustion is dependent upon the average molecular weight and the hydrogen-carbon ratio (both of which can be directly derived from the gravity and viscosity of the fuels), and the sulfur content.

Sulfur has a lower heat of combustion than hydrocarbons and for this reason a correction factor must be added to the chart shown in Fig. 1.

It can be seen from Fig. 1 that the gross calorific value, expressed as B.t.u.

(Continued on page 378)

*Assistant manager of refineries, Eastern States Petroleum Co., Houston.



GAS IS STORED in the Bammel field gas-cap by Houston Pipe Line Co. in summer months as shown at left; when the flow is reversed during the winter, Bammel may deliver as high as 150,000 M.c.f. of gas daily as shown at right.

Bammel Storage Project Nearing Completion

Houston Pipe Line Co. will utilize gas cap of existing cycling project for storage purposes; operation will maintain reservoir pressure for cycling efficiency as well as furnish a reserve supply of gas for peak-day and emergency requirements.

by F. Y. Hutchison*

THE largest underground natural-gas-storage project in the Gulf Coast will serve a dual purpose of maintaining reservoir pressure in a gas-cap cycling project as well as returning gas from the transmission system during the summer months of light demand.

Known as the Bammel project, and operated by Houston Pipe Line Co., the installation will have a maximum peak-day deliverability of 150 million cubic feet, making it the second largest in the Southwest. It is outranked by the Depew project of Oklahoma Natural Gas Co. described in *The Oil and Gas Journal, February 25, 1952, page 136*. Bammel will be ready to receive gas for injection by July 1, 1952.

Bammel storage differs from conventional underground natural-gas-storage operations in that a gas-cycling reservoir is employed rather than a depleted gas field. At Bammel, reservoir pressure will be maintained to insure maximum recovery of hydrocarbon liquids from the gas cap, to recover oil-rim hydrocarbons efficiently and to prevent retrograde condensation of liquids within the reservoir which would occur were reservoir pressure allowed to drop appreciably.

*Consulting staff engineer, Houston Oil Co., Houston.

Major Expansion Program

The storage project is a portion of the $10,000,000 expansion program undertaken by Houston Pipe Line Co., a wholly owned subsidiary of Houston Oil Co. of Texas. This expansion will double the company's capacity to deliver natural gas into the Houston, Galveston, and Texas City markets.

The new facilities will include construction of a compressor station for the gas-storage project, a microwave radio-communication system, and construction of 150 miles of 18, 24, and 30-in. transmission lines and additional gathering facilities.

Peak Day Output High

Gas will be injected into the Bammel reservoir on all but the few cold days of winter. Under normal operation, daily average injection volume moving into Bammel will average only 15,000 M.c.f. per day. However, during peak days of high winter demand, as much as 150,000 M.c.f. per day of gas will be transmitted to Houston markets.

High Productivity

Another advantage leading to the selection of Bammel for the storage-project site is highly permeable gas sand, a factor in the high productivity of the gas wells. Most of these wells have open-flow capacities in excess of 100 million cubic feet per day per well. The high productivity is of prime importance to the pipe-line company since it permits high per well deliveries; thus sudden peak loads can be met quickly and with ease.

During the course of any calendar year, withdrawals will approximate the amounts injected. Although the daily deliveries during cold weather may be of a high order of magnitude, the overall take for the year will be relatively small since no gas will be produced from Bammel storage at other periods of the year.

Compressor Station

Under construction is a compressor station to take gas from the 18-in. line of the Houston Pipe Line Co. at a pressure of 350 psig. Gas will be delivered to the absorber in the cycling plant at 1,100 psig. where it will be processed and compressed by the plant and injected into converted gas-cap wells for storage. This will be a continuous operation except for those few cold days during the winter months when the system will be arranged for peak-day deliverability into Houston.

Houston Pipe Line Co. has constructed an 18-in. pipe line from Bammel to its 12-in. line which originates in East Texas and delivers gas at the

WHITNEY NATIONAL BANK
OF NEW ORLEANS

ESTABLISHED 1883

CONDENSED STATEMENT OF CONDITION
MARCH 31, 1952

ASSETS		LIABILITIES		
Cash and Due from Banks	$ 99,544,496.53	Deposits		$361,772,817.67
U. S. Government Obligations	173,795,256.74	Acceptances		1,794,230.15
State, Municipal and Other Public Bonds	13,248,664.52	Dividends Payable April 1, 1952 and July 1, 1952		224,000.00
Other Bonds and Securities	467,964.60	Reserve for Taxes and Accrued Interest and Expenses		1,197,713.39
Loans and Discounts	93,764,878.74	Other Liabilities		26,162.29
Bank Premises	2,776,631.68	Capital Stock	$ 2,800,000.00	
Other Real Estate	116,787.60	Surplus	12,200,000.00	
Customers' Liability Account of Acceptances	1,566,283.39	Undivided Profits	6,424,322.54	
Accrued Income and Other Assets	1,158,072.24			21,424,322.54
TOTAL	$386,438,246.04	TOTAL		$386,439,246.04

DEPOSITARY OF THE UNITED STATES GOVERNMENT, STATE OF LOUISIANA AND CITY OF NEW ORLEANS
MEMBER OF THE FEDERAL DEPOSIT INSURANCE CORPORATION

SHIPBUILDING
MACHINERY
STEEL FABRICATION
AIR CONDITIONING
REFRIGERATION
SPECIALTY STEELS
PRESTRESSED CONCRETE PILING

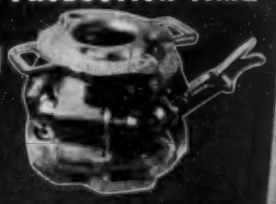
• • •

As a result of 30 years diversified and broad experience in the Metallurgical, Mechanical and Engineering Fields, Equitable has made, and is making significant contributions to Industry at large.

Let Equitable serve you.

EQUITABLE EQUIPMENT CO., INC.
410 Camp St. RA. 9744
NEW ORLEANS 12, LA.

INCREASE PRODUCTION TIME
with the
KINZBACH
automatic
tubing
spider



THIS revolutionary development utilizes parallel-linkages to control the slip segments — a design which makes pipe handling faster and safer than ever before. The segments move at all times perfectly parallel with the tubing. The parallel slips provide a stronger grip than the conventional wedge design and will not gouge or score the tubing.

A single lever actuates the slips and they may be locked in either "open" or "closed" position. All segments are held in alignment with the tubing at all times and true radial closure is obtained.

The assembly is hinged and may be placed around the tubing without breaking a joint and may be used on well-head fittings or set in the rotary bushing.

Write for Bulletin 23151.

KINZBACH TOOL CO INC

KINZBACH TOOL CO., INC.
P. O. Box 277
HOUSTON 1, TEXAS
Export Office: 74 Trinity Place, New York, N. Y.

gates of Houston on the north side of the city. Gathering lines are being built to each producing well in the gas cap at Bammel and to the two injection wells; the injection wells will be available for output wells during peak-delivery periods.

An additional connection is made to the plant discharge for makeup of peak-day volume requirements of from 125 to 150 million cubic feet per day that may be needed during a severe cold spell.

Bammel field, located 14 miles north of Houston, is a gas-distillate reservoir with an oil rim productive from the Yegua sands of Tertiary Eocene age, found at an average depth of 6,170 ft. The field was discovered during 1937.

In order to conserve the reservoir energy and to produce the maximum recovery of oil and distillate without waste, field operators unitized the area at an early date in its field life. A cycling plant was built to recover casing-head gasoline from the produced gas and to return the residue to the Yegua sands to maintain reservoir pressure.

At this writing, the dry gas returned to the sand has encroached on nearly all of the field; consequently liquid recovery is rapidly decreasing at the plant.

A serious loss in reservoir pressure was brought about as a result of a well blowing wild; this well cratered and was controlled only after a sizable loss of gas.

Another important phase of the field operation is the importance of maintaining reservoir pressure for depletion of the oil phase under maximum recovery of the oil in place. At the economic limit of oil phase depletion, the operators can then sell their gas reserve in the gap cap as they then see fit.

TRUCK WINCHES

Tougher — they last longer and stand up better in the rugged service you have to give them in the oil industry. They need less maintenance . . . always ready. Gar Wood Winches have the "pull" to pull down costs — both operation and maintenance. Many exclusive features of construction make them the preferred winches wherever the work is rough and tough. Write for Bulletin.

52-13

GAR WOOD INDUSTRIES, INC.

Wayne Division • EXECUTIVE OFFICES, WAYNE, MICHIGAN

TRUCK EQUIPMENT: Dump Truck Bodies & Hoists, Winches & Cranes, Refuse Collection Bodies, Elevating End-Gates. CONSTRUCTION EQUIPMENT: Excavators, Scrapers, Dozers, Ditchers, Spreaders, Finegraders, Truck-Mounted Road Graders.

New Correlations for Fuel-Oil Properties

(Continued from page 375)

per lb., increases with A.P.I. gravity. However, since the fuel oil is sold by the gallon and the pounds per gallon increase with a decrease in gravity, the net effect is that a lower-gravity fuel will give more B.t.u. for any given price per gallon.

It is for this reason that users of this fuel are becoming more conscious of the variables affecting economy in the use of this combustible material. This chart should be very helpful to the different companies which burn Bunker C fuel for its heat of combustion and do not have extensive laboratory facilities for running these tests.

Example 1 . . . Calculate the calorific value of a 10.5° A.P.I. Bunker C fuel having a viscosity at 122° F. of 300 and a sulfur content of 2.0 weight per cent.

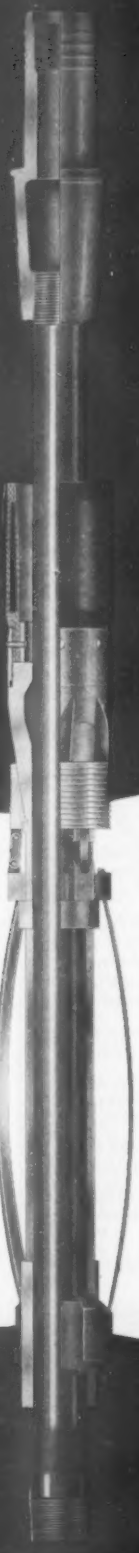
From Fig. 1 the gross calorific value was calculated to be 18,270 B.t.u. per lb.

In the blending of fuel oils to make certain viscosity specifications a trial-and-error laboratory procedure was followed for determining the required amounts of various components. This procedure caused considerable delay in both the determination of the blend to be made, but also in the actual blending of the fuel oil.

A high-viscosity reduced crude or cracked residuum is usually blended to viscosity with heavy gas oil or furnace oil, and since viscosities of the two components are expressed in different units at different temperature levels, laboratory correlation work on quite a variety of stocks was undertaken. Correlations of the data obtained are presented as the blending chart shown in Fig. 2.

Example 2 . . . Calculate the quantity of gas oil (34.5 S.s.U. @ 100° F.) required to blend cracked residuum (800 S.s.F. @ 122° F.) to a viscosity of 150 S.s.F. @ 122° F.

Using Fig. 2, the quantity of gas oil required is calculated to be 12.5 per cent.



NEW TYPE S

-POSITIVE SEAL

-POSITIVE SETTING

-POSITIVE RELEASE

AT ANY DEPTH

Once you've used this new Type S Packer, you'll agree that here is the outstanding packer for extremely deep, hazardous wells! For example, even in those difficult off-center wells where the tubing rides the casing wall, this new packer is designed to set, seal and release with dependable, positive action!

You get positive seal because this Type S Packer is equipped with American Iron's specially designed, patented packer cup — used so successfully on all American Iron Packers. Heavy-duty dovetail slips provide positive setting with assured release at any depth! Feature by feature — you'll find that this new Type S Packer is the sum-total of all our many years experience in designing and manufacturing packers!

Send for special TYPE S PACKER BULLETIN now available upon request.

AMERICAN IRON & MACHINE WORKS CO.
MANUFACTURERS OF OIL FIELD EQUIPMENT
OKLAHOMA CITY U.S.A.

AMERICAN IRON & MACHINE WORKS CO.

OKLAHOMA CITY, OKLAHOMA • BOX 1177 • PHONE L. D. 518
DISTRICT OFFICE: HOUSTON, TEXAS
EXPORT OFFICE: 11 WEST 42ND STREET, NEW YORK CITY, N. Y.

Louisiana Gas Consumption Up 76 Per Cent . . .

. . . Thanks to expanded transmission lines

by R. G. Loper*

THE consumption of natural gas in Louisiana has been steadily increasing since 1947. In the interval between 1947 to 1951, the increase amounted to more than 76 per cent. This has not necessarily taken place with the overloading of existing systems, but rather with the installation of networks of gas-transmission lines that cover the entire State of Louisiana.

Gas distribution . . . Over 860 miles of various-sized lines have been laid or completed in the state during the last 12 months of operation. This represents a transmission increase of over 2,000,000,000 cu. ft. of gas per day. Of this increase, 32 per cent is scheduled for production to be consumed in other states, 21 per cent represents out-of-state production that is earmarked for Louisiana consumption, and the remaining 47 per cent is for Louisiana production for Louisiana consumption (See Fig. 1).

The increased consumption and transmission in Louisiana has made natural gas available to many of the smaller towns not previously having gas utilities and the new industries which have recently started operations.

The major portion of the gas coming into the state, especially to the northern part, is produced in Texas. That portion of gas leaving the state enters the lines that supply gas to the many eastern states from Florida to Pennsylvania and can not be pin pointed as to the actual place of consumption.

New lines . . . The new transmission lines that have been completed in the past 12 months in Louisiana may be broken down as to line size and length as follows:

Outside Diameter (In.)	Per Cent of Total Mileage Increase
30	38.7
26	2.9
24	3.9
20	15.8
18	4.7
16	14.0
14	1.6
12¾	5.7
10¾	5.0
8⅝	2.1
6⅝	2.1
4½	3.5

Here, transmission lines were considered to be only those that were installed for delivery into lines transporting gas to sales points such as city or industrial gates and not the individual field gathering lines. The greater percentage of large-diameter lines indicates that they were parts of large transmission systems.

To accomplish this increase in gas

*Assistant professor of petroleum engineering, Louisiana State University.

GRIFFENHAGEN & ASSOCIATES

ESTABLISHED IN 1911

Consultants in Management

CHICAGO
333 North Michigan Avenue
Telephone RAndolph 6-3686

New York • Boston • Washington • Milwaukee
Dallas • Los Angeles • Montreal

In their fifth decade of service, and with extensive experience in the oil industry, Griffenhagen & Associates are in a better position than ever to render to oil companies counsel and active assistance on projects having to do with:

Organization structure, organization manuals, and management guides;

Management and operating procedures, management controls, and the quality and effectiveness of supervision and performance at all levels;

Position classification and evaluation, wage and salary plans, selection, training, and utilization of personnel, performance rating, executive development, employee relations, employee benefits plans, personnel records, and personnel administration generally;

General and cost accounting, operating reports, capital and operating budgets, and budgetary controls;

Materials management, article identification, cataloging, spare parts listings, the determination of stock position and requirements, purchasing, storehouse operations, stock accounting. inventory controls, and physical inventorying;

Property management, including records and procedures essential to assignments and control of mobile equipment;

Transportation management and operations and traffic management; or

Office management, general office services, forms design and standardization, office records and procedures, and internal communication.

Inquiry as to how the firm might assist on any particular problem entails no obligation.

Security CASING SCRAPER

- ***FIRST*** **to operate with rotary or vertical motion while going in or coming out of the hole**
- ***FIRST*** **to cut to exact inside diameter**
- ***FIRST*** **to positively clean every inch of casing**

Cutters of Security Casing Scrapers have helical teeth for positive shearing action and are expanded to full inside diameter by spring pressure. Cutters contact entire casing circumference at all times.

Security Casing Scrapers quickly and easily remove obstructions inside casing — such as scale, gun perforation burrs, or cement sheaths resulting from cementing operations.

Operators everywhere use the Security Casing Scraper as part of their well completion programs.

GET Security IN DRILLING

ONE OF THE DRESSER INDUSTRIES

SECURITY ENGINEERING CO., INC.

Main Office and Plant: Whittier, California
Branches in all major producing areas
Export Office: Chanin Building, New York City

ROCK BITS • REAMERS • HOLE OPENERS • CASING SCRAPERS • SECURALOY

512-5

MAGCOBAR HIGH YIELD makes a balanced mud even with brackish water

- spudding
- core holes
- workovers

Carefully mined from selected deposits, Magcobar High Yield Drilling Mud is a stable clay well suited for use with brackish water. High Yield is a ready mixed mud in dry form. Only water need be added to provide a superior drilling mud for use in spudding, drilling core holes, and workovers where a low weight mud is desired with proper viscosity, gel strength and good wall building properties. Precisely processed and classified, Magcobar High Yield Drilling Mud is resistant to salt and other contaminants often present in make up water. It has proved to be a valuable additive to high pH-lime muds for control of viscosity and filtration properties. High Yield Drilling Mud makes approximately 50 bbls. of 15 centipoise mud per ton and is one of the most economical materials for building a balanced mud. Ask your Magcobar engineer or nearby Magcobar Dealer how you can save long water hauls and rig time with High Yield Drilling Mud.

MAGCOBAR ★ MAGCOGEL ★ HIGH YIELD ★ MAGCO-FIBER ★ XACT CLAY ★ FIBER SEAL ★ LEATHER-FLOC ★ FORM-A-PLUG ★ CELL-O-SEAL SALT GEL ★ MAGCO-PHOS ★ RED-OX ★ MAGCO-MICA ★ TANNATHIN JEL-OIL MUD ★ JEL-OIL "F" ★ "E" CONCENTRATE ★ NOHEEV MY-LO-JEL PRESERVATIVE ★ QUEBRACHO ★ CHEMICALS

MAGNET COVE BARIUM CORP.

One of the Dresser Industries

MALVERN, ARKANSAS HOUSTON, TEXAS

Magcobar
Complete
DRILLING MUD SERVICE
DEALER

One of the Best Things That Ever Happened to the Oil Industry

transmission, United Gas Pipe Line Co. was a major contributor for Louisiana was the recipient of a great portion of United's new $180,000,000 expansion program. This expansion program will increase United's Gulf Coast transmission to nearly 4 billion cubic feet of gas per day which is approximately a 30 per cent increase over last year's 3 billion cubic feet per day.

By the end of 1953, approximately 80 per cent of sales by Louisiana Natural Gas Corp. will be Louisiana production for interstate shipment. This trend is not indicative of all the companies operating in Louisiana, for many of the companies operate only in this state. Gas coming into Louisiana is nearly balanced by the gas transported for out-of-state consumption.

However, this picture should continually change and a general increase in out-of-state consumption of Louisiana gas should be noted due to the fact that more and more gas reserves are being discovered, as is true in all the Gulf Coast states. A general increase in requirements for gas transmission is indicated. New manufacturing and industrial plants are being built and those already established are being expanded beyond the capacity of the existing lines.

These and many other reasons can point in only one direction and that is for a continued increase in the transmission facilities in Louisiana.

No depletion seen . . . The prospect of depleting the existing Gulf Coast reserves in Louisiana in the forseeable future is very small, at the present rates of production and discovery. The incentive to develop proven reserves and to discover new reserves can be maintained only as long as a fair price is paid for the gas at the well head on a competitive basis. In comparison, using B.t.u. content as a basis, gas is selling for approximately one-tenth as much as 35°-A.P.I.-gravity crude oil.

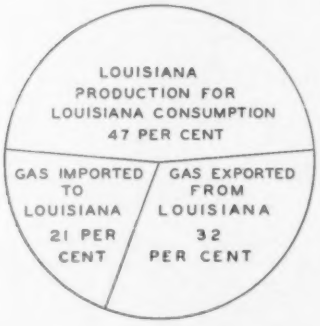


Fig. 1

Union Producing Revives Old Gas Area in Mississippi

UNION PRODUCING CO. is developing a new gas field in northeastern Mississippi to reopen another Lower Paleozoic gas province. The discovery is at Muldon in Monroe County, about 25 miles west of the Alabama state boundary. Currently, two rigs are being operated in development of the 5,100-ft. Mississippian gas pay.

A new province . . . The discovery is significant in that it reopens a new province of Lower Paleozoic rocks including the Mississippian and Pennsylvanian objectives lying on the steeply

THOMAS Flexible ALL METAL COUPLINGS
FOR POWER TRANSMISSION • REQUIRE NO MAINTENANCE

REFINERS! PIPE LINE MEN!
DRILLING ENGINEERS!
LABORATORY TECHNICIANS!

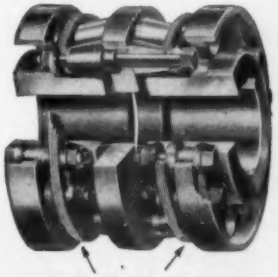
All can use Thomas Couplings to their advantage on Pumps, Compressors, Cooling Towers, Rigs or any tough job where continuous operation and dependability are required.

Specialists on Couplings for more than 30 years

Patented Flexible Disc Rings of special steel transmit the power and provide for misalignment and end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes:
½ to 40,000 HP
1 to 30,000 RPM

BACKLASH
FRICTION
WEAR and
CROSS-PULL
are eliminated
Lubrication is not required!



PATENTED FLEXIBLE DISC RINGS

THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.
• • •
NO MAINTENANCE PROBLEMS.
• • •
ALL PARTS ARE SOLIDLY BOLTED TOGETHER.

Write for the latest reprint of our Engineering Catalog.

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

dipping, southward-plunging nose of the Cincinnati arch when it enters the Eastern Gulf embayment. The area also lies on the western limb of the Warrior basin of northwestern Alabama. There has been no major oil or gas development heretofore except for small Amory gas field of Monroe County which was abandoned in 1937 after producing only 2 billion cubic feet of gas; Fayette gas field of northwestern Alabama was of small proportions.

Strategic location . . . The new Muldon gas discovery lies at the northern termini of major Gulf Coast natural-gas distributing systems and industrial centers in Alabama. Nearest significant oil or gas production lies 100 miles to the southwest in Tinsley oil field; major gas fields lie to the south at Baxterville and other areas.

History of Discovery

Union Producing Co. took over an abandoned dry hole completed 11 miles north of the village of West Point in southwestern Monroe County last year after it had been worked over by three independent oil men; the well had blown out after the hole was reopened and the entire string of drill pipe was lost in the hole. The well was designated as 1 J. T. Sanders, in the approximate C SW SW of 22-15s-6e, and was originally drilled to a total depth of 5,932 ft. on November 9, 1941.

Union purchased a one-half interest in the well and the block of surrounding acreage. J. B. Fletcher Drilling Co., of Shreveport, moved in rotary rig for United on November 27, 1951, to complete the well. It is productive

MULDON GAS FIELD of Northeast Mississippi, shown by arrow, reopens former gas province.

DISCOVERY WELL of the new Muldon field, Union Producing Co. 1 J. T. Sanders, Monroe County, Mississippi.

DRILL PIPE FOR RENT

No need to tie-up operating capital in drilling equipment! Just call "Associated"! Drill pipe and tools are maintained in excellent condition, ready for immediate delivery on rental basis. All six yards (listed below) are equipped to give you fast 24-hour service!

ALSO

- DRILL COLLARS
- KELLYS
- KELLY DRIVE BUSHINGS
- CORE BARRELS
- SAFETY JOINTS
- ROTARY SLIPS
- BLOWOUT PREVENTERS
- ROTARY TONGS
- ELEVATORS
- ROTARY SUBS

(*Right*) All pipe returned to our yards is steam cleaned and rigidly inspected.

(*Left*) Returned pipe is straightened, repaired to first class condition and threads properly lubricated before being replaced on racks.

MAIN OFFICE — HOUSTON, TEXAS

HOUSTON, TEXAS
Phone CApitol 9596

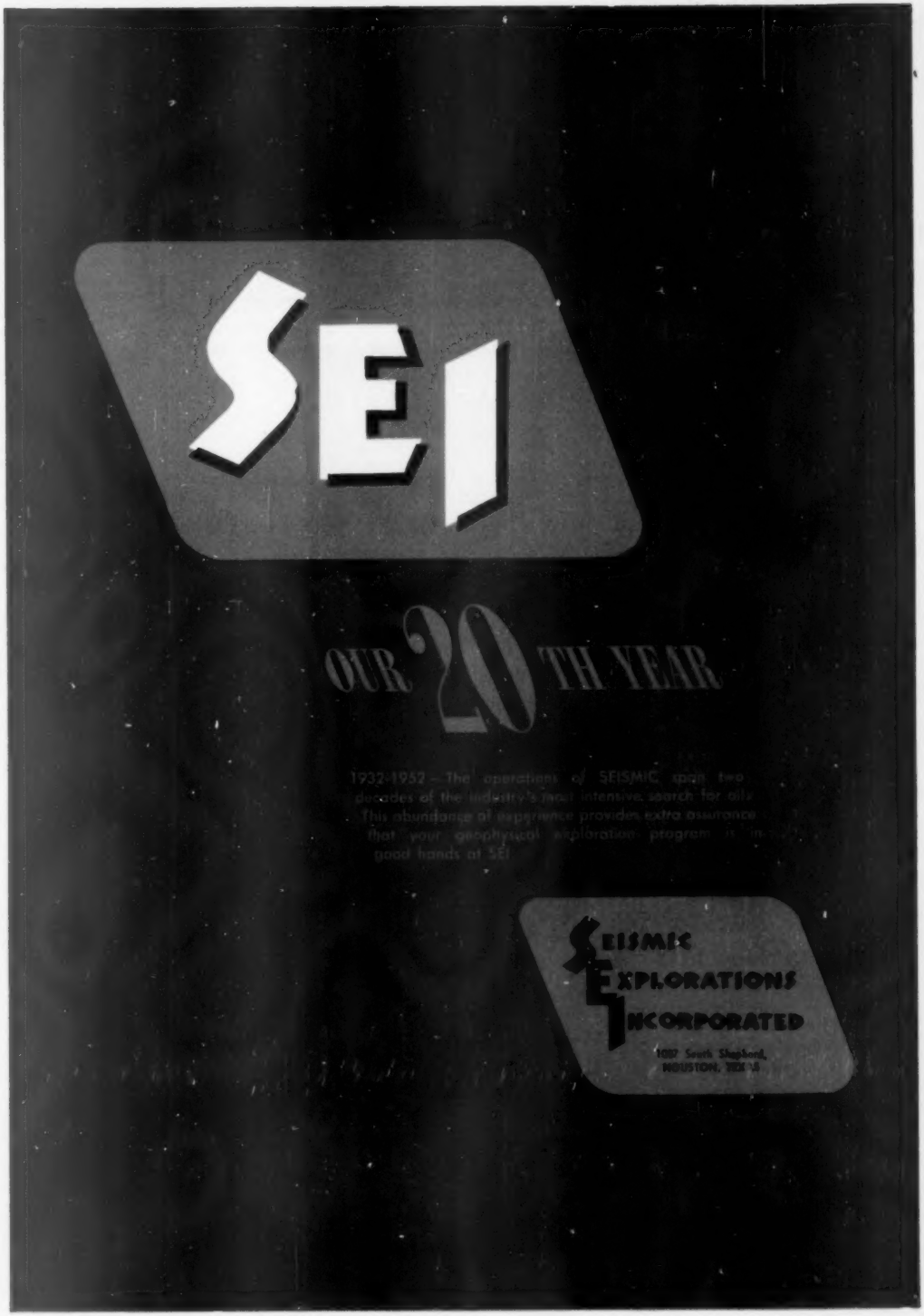
CASPER, WYOMING

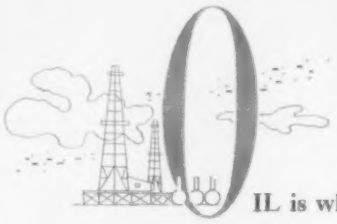
ODESSA, TEXAS
Phone 2331

NEW IBERIA, LA.
Phone 1553-J

HARVEY, LA.
Phone UPtown 8585

ASSOCIATED A OIL FIELD INC. RENTALS


SEI
OUR 20TH YEAR
1932-1952 — The operations of SEISMIC span two decades of the industry's most intensive search for oil. This abundance of experience provides extra assurance that your geophysical exploration program is in good hands at SEI
SEISMIC
EXPLORATIONS
INCORPORATED
1007 South Shepherd,
HOUSTON, TEXAS



OIL is where you find it. And wherever oil is found, you will find REPUBLIC, ever alert to the requirements of the industry.

Throughout the oil country, modern and completely stocked REPUBLIC SUPPLY STORES continue to maintain the company's time-honored record of dependable service.

Whatever your equipment need — whatever your location — your call to REPUBLIC is your assurance of prompt handling and fast delivery.

Republic Supply COMPANY

GENERAL OFFICES - - - HOUSTON 1, TEXAS

Thousands of carefully selected products from more than 50 convenient locations.

from the Hartselle sandstone of Mississippian age.

Most of the drill pipe was recovered after several weeks of fishing. Union set and cemented a string of 5½-in. pipe at 5,186 ft. The well was perforated 5,081-82 ft. and completed February 18, 1952, flowing 35,000 M.c.f. of gas per day; initial rock pressure 2,003 psig.

Development of the new field started with Union staking the first offset ½ mile northwest of the discovery well. On last field report it was coring at 4,650 ft.

Four miles southeast of the new Muldon discovery, Union's 1 Nancy Watson has been coring below 4,730 ft. in hard sand. Eight miles due east of the discovery, Dalton, Buie & Co. is drilling below 3,800 ft. at 1 J. A. Cole.

Sea-Going Cementing Service

(Continued from page 370)

equipment consists of two 800-sack storage vans. Each van is powered by two Continental engines, one engine being used as a standby while the other discharges cement by screw conveyor.

Howco 402 is also a flush-deck barge with the following dimensions: 32 by 110 ft. long, 6 ft. 6 in. in depth. Cementing equipment on this barge consists of two vertical pumps, one horizontal, four steam pumps, and a 40-bbl. measuring tank. Bulk cement storage is two 500-bbl. standard storage tanks with air belts located at the bottom of these tanks. The tanks discharge cement to one common angular screw into cement hopper. Each tank has a capacity of 2,000 sacks of cement. Located aft on the barge is a generating unit which consists of a Cummins Model HI-600 diesel engine attached to a 30-kva. generator. All auxiliary power on this barge for bulk cement is 220-volt, 3-phase a.c.

Manifolding on all boats is similar, and is so arranged that the pumps may be operated individually, in parallel, or in compound as may be required. It has been designed for maximum flexibility of control to accommodate both the usual and abnormal service conditions. All controls are centralized at a convenient point where the operator may observe every operating unit at all times. Both controls and the operating mechanisms are arranged for maximum safety and speed of operation.

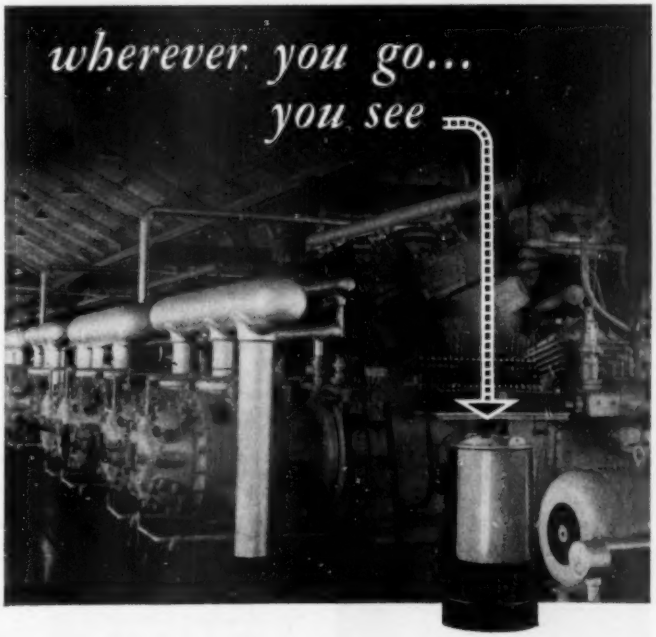
Radio . . . All boats are equipped with radio telephones, operating on industrial frequency of 2,292 kc., as well as New Orleans marine operator, two ship-to-ship frequencies of 2,638 and 2,738, and Coast Guard frequency of 2,670.

Crews work 10 days on and 5 days off. The changing of these crews is made with the crew boats 502 and 503. Boat 502 is a 36-ft. wooden hull, propelled by one 6-71 G.M. diesel engine. Boat 503 is 38 ft. over-all, has a 12-ft. beam and 2½-ft. draft; steel hull, twin-screw propelled by two 6-71 G.M. diesel engines, with speed of 30 m.p.h. It is also equipped with a marine radio.

At present four boats are working in the vicinity of the mouth of the Mississippi River, one at Pointe a la Hache, and Howco 401 and 402 south of Houma, La., at Montegut and Leeville.

'Pillow' Tank Stores Gasoline

A synthetic rubber-nylon pillow-like gasoline tank that lies flat on the ground and provides 10,000 gallons of storage capacity has been developed by Army engineers. The collapsible container will replace conventional steel tanks and the familiar 55-gallon drums used for Army oil storage. The container is transported in a protective box. When needed, it is rolled out on the ground like a rug.



HONAN-CRANE *Oil Purifiers*

Experienced Diesel operators insist on Honan-Crane Oil Purifiers for safe, dependable protection against break-down and excessive wear due to contaminated oil. Continuous HONAN-CRANE oil purification (for either inhibited or straight mineral oils) protects bearings, cylinder walls and other finely machined parts from improper lubrication and costly damage often caused by solid abrasive contaminants or by acids, gums, resins and other products of oxidation.

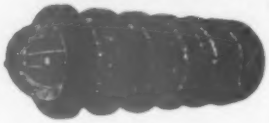
HONAN-CRANE fuel and lube oil purification gives your Diesels thorough, dependable, economical protection! Write today for complete information.

WORLD LEADING OIL FILTER MANUFACTURER

Honan-Crane Corporation
822 WABASH AVENUE, LEBANON, INDIANA
A Subsidiary of **Houdaille-Hershey Corp.**

ALL HONAN-CRANE EQUIPMENT IS SOLD ON A PERFORMANCE GUARANTEED BASIS

EXPANSIBLE
INTERNAL
PIPELINE CLEANER
DESIGNED AND PROVEN
BY PIPELINE MEN



All sizes 6" to 30"

UNLESS YOU ARE USING THE EXPANSIBLE CLEANING MACHINE, YOUR LINES ARE NOT BEING THOROUGHLY CLEANED.

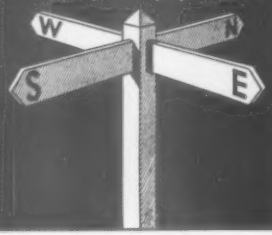
EXPANDS for constant pressure on all sides. Compensates for brush wear.

FLEXIBLE to eliminate stoppage on bends, drops, etc. Can traverse 90° 1½ radius tube turns.

EFFICIENT cleaning pays off in increased gas volume.

CLEANER PIPELINES CO.
1900 Armour Rd. No. K. C. 16, Mo.

"serving all pipelines"



PIPELINE COATINGS
and
WRAPPING MATERIALS

S. D. DAY COMPANY
1913 WESTCRAY HOUSTON, TEXAS PHONE JU 2431

Pipe-Line Construction

FOLLOWING is a tabulation of pipeline projects which are planned or under construction. Included are crude-oil, products, and natural-gas lines. This list is compiled from surveys made by The Oil and Gas Journal.

Crude-Oil Pipe Lines

American Petroleum Co.—30 miles, 6-in., under way, Village Mills to Arriola Field, Hardin County, Texas. J. R. Stewart, contractor. Completion date 5-15-52.

8 miles, 12-in., authorized, looping Samaria to Earhart, Mich.

15 miles, 12-in., authorized, looping Sylvania, Ohio, southward.

Cities Service Pipe Line Co.—64 miles, 18-in., planned, Sour Lake, Tex., to Lake Charles, La. Completion date 1-1-53.

19 miles, 8-in., under way, Cushing to Guthrie, Okla. Gragg Const. Co. Completion date 6-1-52.

Continental Pipe Line Co.—105 miles, 8-in., contracted, Rincon to northwest of Sullivan City on to Port Isabel, Tex. Western Const. Co. Completion date 9-30-52.

217 miles, 12-in., authorized, Wichita Falls, Tex., to Ponca City, Okla. Completion date 1952.

Gulf Refining Co.—80 miles, 24-in., proposed, Midland to Colorado City, Tex.

Humble Pipe Line Co.—4, 6, 8, 12-in., proposed, Upton and Reagan counties, Texas.

201 miles, 12-18-in., planned, Hawkins to Baytown, Tex.

Interstate Oil Pipe Line Co.—33 miles, 20-in., under way, Bunkie to Melville, La. Latex Const. of Georgia. Completion date 5-52.

68 miles, 16-in., authorized, Raceland to Anchorage, La. Completion date 10-52.

18 miles, 12-in., authorized, LaRose to Raceland, La. Completion date 10-52.

47 miles, 16-in., authorized, Sunset to Anchorage, La. Completion date 12-52.

21 miles, 12-in., planned, Duck Lake and Bayou Sale to New Iberia, La. 7-31-52.

36 miles, 16-in., planned, Flora to Bunkie, La. Completion date 12-31-52.

42 miles, 4-6-10-in., planned, Esperance Pt., Fairview and Lisemore Landing, La., to Cranfield, Miss. Completion date 8-15-52.

23 miles, 8-in., Cranfield Sta.—Esperance Point, Miss., Latex Const. Co. of Ga.

20 miles of 4 and 8-in. laterals, Latex Const. Co. of Ga.

Pan American Pipe Line Co.—27 miles, 26-in., planned, Genoa to Texas City, Tex. Completion date 12-52.

40 miles, 14-in., planned, Arden Station in Irion County to Eldorado Station in Schleicher County, Texas. 6-52.

Pasotex Pipe Line Co.—195 miles, 8-in., under way, El Paso to Wink, Tex.

Platte Pipe Line Co.—1,075 miles, 16, 20-in., under way, Worland, Wyo., to Wood River, Ill. Completion date 1952.

573 miles, 16-20-in., under way, Worland, Wyo., to Holdredge, Neb. R. H. Fulton & Co., contractor. A. A. Carrigan, spreadman at Scotts Bluff, Neb.

142 miles, 20-in., under way, Holdredge, Neb., to Kansas State Line, Fulton & Brodie, contractor, J. T. Brodie, spreadman.

Section 7. 274 miles, 20-in., Missouri River to Salisbury, Mo., and Section 8, Salisbury to Mississippi River, under way. O. R. Burden Construction Co. Al Perry, spreadman at Carrolton, Mo.; river crossing field office, Hartford, Ill. Dick Jernigan, spreadman.

Progress Pacific Pipe Line Co.—900 miles, 20-in., proposed, Permian basin, West Texas to California.

Rancho Pipe Line System.—455 miles, 24-in., authorized, McCamey to Houston, Tex. Completion date late 1952. (Joint project with Sinclair Pipe Line Co., Pan American Pipe Line Co., Tidewater Pipe Line Co., Nantucket Pipe Line Co., Phillips Pipe Line Co., and Ashland Pipe Line Co. with Shell Pipe Line Corp. handling construction and operation.)

267 miles, contracted, McCamey to Cedar Valley near Austin, Tex. Anderson Bros. Corp.

190 miles, 24-in., contracted, Austin to Shell's Deer Park Refinery (Houston area).

68 miles, 24-in., under way, Deer Park refinery west to Brazos River. Oklahoma Pipe Line Constructors, contractor. Spread 1—Louis Visentine, Pasadena, Tex.; Spread 2—Raymond Law, 1100 Old Spanish Trail, Houston.

126 miles, 24-in., under way, Brazos River west to Austin. Houston Contracting Co.

Roosevelt Oil & Refining Corp.—22 miles, 4 and 6-in., authorized, St. Helens to Norwich, Mich.

Service Pipe Line Co.—29 miles, 10-in., planned, Saunders to Denton, N. M. Completion date 5-52.

33 miles, 16-in., planned, Bowie, Tex., to Drumright, Okla.

30 miles, 6-in., Knox and Haskell counties, Texas.

29 miles, 4, 6, 8-in., proposed, Natrona County, Wyoming.

Shell Pipe Line Corp.—42 miles, 8-in., authorized, Halletsville to LaGrange, Tex. Completion date 7-1-52.

Sinclair Pipe Line Co.—674 miles, 22, 24-in., under way, Drumright, Okla., to East Chicago, Ind. Completion date 1952.

Section 1—150 miles, 24-in., under way, Drumright-Cushing, Okla., area, to Humboldt, Kans. O. R. Burden Construction Co.

(Spread) 1) 60 miles, 24-in., under way, Caney to Humbodlt, Kans. A. B. Haynes, superintendent, at Chanute, Kans.

(Spread 2) 90 miles, 24-in., under way, Cushing, Okla., to Caney, Kans. Floyd Lewis spreadman at Hominy, Okla.

184 miles, 24-in., under way, Humboldt, Kans., to Salisbury, Missouri. R. H. Fulton & Co., contractor, M. L. Boyd and Jerry Nash, spreadmen.

Sterling Pipe Line System.—53 miles, 12-in., authorized, Sterling, Colo., to connection with Platte Pipe Line at Gurley, Neb. (Includes 20 miles, 10-in., main line; 35 miles, 8-in., branch lines.) Joint venture comprising Toronto Pipe Line Co., Shell Pipe Line Corp., and Texas Pipe Line Co.

Sun Pipe Line Co.—99 miles, 4, 6, 8-in., proposed, Scurry County, Texas.

34 miles, 8-in., planned, Jameson to Colorado City, Tex.

13 miles, planned, Cogdell to Brice Island.

Texas Pipe Line Co.—319 miles, 22, 12, 10-in., under way, Louisiana Gulf Coast to Port Arthur, Tex., including 220 miles, 22-in., Houma, La., to Port Arthur, Tex.; 31 miles, 12¾-in., Houma to Cocodrie, La. Houston Contracting Corp. Completion date in summer 1952.

175 miles, 16-in., under way, Corsicana to East Houston, Smith Contracting Corp. Frank Craig, spreadman at Teague, Tex. Completion early summer.

319 miles, 22, 12, 10-in., under way, Louis-

iana Gulf Coast to Port Arthur, Tex., Houston Contracting Co.

220 miles, 22-in., under way, Houma, La., to Port Arthur, Tex. Houston Contracting Co.

67 miles, 22-in., under way, Holmwood, La., west to Port Arthur, Tex. Houston Contracting Co., E. C. Norris, superintendent at Lake Charles, La.

67 miles, 22-in., under way, Holmwood east to Gueydan, La., and from Morgan City east to Houma. Houston Contracting Co. W. H. Hayes, superintendent at Jennings, La.

86 miles, 22-in., under way, Gueydan east to Morgan City, La. Houston Contracting Co. F. A. Silar, superintendent at Abbeville, La.

65 miles, 6, 8, 10-in., under way, and 30 miles, 12-in., Houma, La., south through Terrebonne Bay vicinity. Houston Contracting Co. H. L. Leake, superintendent at Houma

West Coast Pipeline Co.—986 miles, 20-22-in., planned, Snyder, Tex., to Norwalk, Calif.

West Texas Gulf Pipe Line Co.—466 miles, 26-in. under way, Colorado City, Nederland, Tex., Anderson Bros.

112 miles, 20-in., planned, Wortham-Longview, Tex.

22 miles, 10-in., planned, Wortham-Corsicana, Tex.

79 miles, 24-in., planned, Midland-Colorado City, Tex.

Products Pipe Lines

Bell Oil & Gas Co.—150 miles, 6-in., planned, Ardmore to Drumright, Okla. (Includes 114 miles, 8-in., 32 miles, 6-in.) Completion date 6-1-53.

Buckeye Pipe Line Co.—370 miles, 8, 12, 16-in., authorized, Linden, N. J., via Allentown, Pa., to Auburn, Syracuse, Waterloo, and Rochester, N. Y. (Sections divided as follows: 75 miles, 16-in., 218 miles, 12-in., 77 miles, 8-in.). Completion of 16-in., 1952, balance 1953.

Coastal Products Pipe Line Co.—260 miles, 20-in., proposed, Houston to Baton Rouge.

Derby Oil Co.—30 miles, 4-in., under way, Wichita to Bell, Kans. Completion date 7-1-52.

Gulf Refining Co.—78 miles, 8-in., under way, Port Arthur to Deer Park, Tex., Glaser Const. Co., Barry Const. Co.

28 miles, 8-in., under way, El Vista to Orange, Vawter Const. Co., I. R. Stewart Const. Co.

Keystone Pipe Line Co.—60 miles, 12-in., proposed, Pt. Breeze, Pa., to Montello, Pa. Completion date 12-31-52.

Ohio Oil Co.—255 miles, 8, 10-in., proposed, East St. Louis, Ill., to Indianapolis.

24 miles, 8-in., authorized, East St. Louis to Wood River, Ill.

214 miles, 12-18-in., planned, Lima to East Sparta and Newark, Ohio.

Phillips Oil Co.—28 miles, 12-in., authorized. Sweeney to Freeport, Tex. Completion date 3-52.

Phillips Pipe Line Co.—42 miles, 10-in., under way, Green River to Villa Ridge, Mo. Mid-States Const. Co. T. H. Edmonds, superintendent at Sedalia, Mo.

68 miles, 12¾-in., under way. Osawatomie westward to Wichita, Kans. Brown Lite Co. R. E. Carriker, spreadman at Osawatomie, Kans.

40 miles, 10-in., through Monteau, Cole, Osage, and Gasconade counties, Missouri. Trojan Const. Co. E. L. Maggard, spreadman at Linn, Mo.

Under way, Paola, Kans.-Harrisonville, Mo. Smith Contracting Corp.

74 miles, 8-in., under way, looping from Decatur, Ill., to East Chicago, Ind. Somerville Const. Co., contractor.

137 miles, 10-in., authorized, looping from Paola, Kans., to East St. Louis, Ill.

Pioneer Pipe Line Co.—(Continental Pipe Line Co. and Sinclair Pipe Line Co.). 310

THE NEW FOSTER 50-G2
Pressure Reducing Regulator
IS A NATURAL

It combines extremely close regulation and high inlet-to-outlet ratio, under varying loads — approaching *instrument control* — with the freedom from trouble, long life and easy maintenance of a *regulator*.

Here's Why:

Although the new 50-G2 is single-seated for tight shut-off, it has the throttling action of a double-seated valve. Full balanced pilot valve and short travel of operating steam to the main valve piston cut the lag in response, for extremely close following of the demand. Yet overtravel, flutter and chatter are eliminated by the mass of the piston, stabilizing multi-rings, and unrestricted area under the piston.

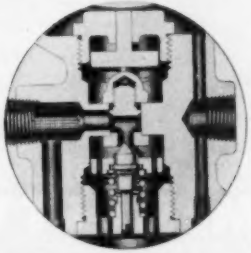
Pilot valve opening *with* the flow minimizes deadhead loss, and permits higher inlet-to-outlet ratio, for instance, 250# to 2#. May eliminate intermediate stage in low pressure applications such as deaerating water heaters, tank storage heaters and auxiliary exhaust systems.

All wearing parts are of stainless, corrosion and erosion resisting materials. New alloy metals mean less wear.

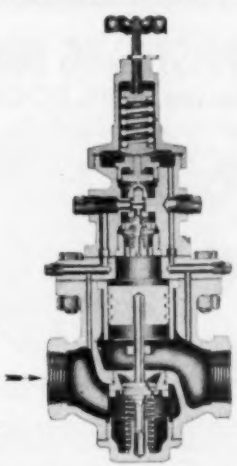
No special tools are needed for servicing, and no outside media are required for operation.

Available for initial pressures 25—1200 P.S.I.G.; temperatures to 950°F; reduced pressures from controlled vacuum of 15" HG. to 600 P.S.I.G. with minor changes in top assembly; sizes ½" to 12".

For full information, ask for Bulletin G-101.



50-G2 Auxiliary or Pilot Valve Unit



Foster Type 50-G2 Internal Pilot Operated Pressure Reducing Regulator with Standard Top Assembly

FOSTER ENGINEERING Company

835 Lehigh Avenue · Union, N. J.

PRESSURE REGULATORS . . . RELIEF AND BACK PRESSURE VALVES . . . CUSHION CHECK VALVES . . . ALTITUDE VALVES . . . FAN ENGINE REGULATORS . . . PUMP GOVERNORS . . . TEMPERATURE REGULATORS . . . FLOAT AND LEVER BALANCED VALVES . . . NON-RETURN VALVES . . . VACUUM REGULATORS OR BREAKERS . . . STRAINERS . . . SIRENS . . . SAFETY VALVES . . . FLOW TUBES

FOR MODERN PIPE LINE WELD CONTROL

RADIOGRAPHY

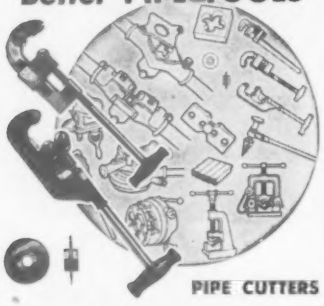
Cut expenses by eliminating many costly cut-outs. Improve the general quality of welding.

FREE Descriptive folder explaining radiography.

ELDER & McNULTY

8 SOUTH LANSING
TULSA, OKLAHOMA

ARMSTRONG BROS.
Better PIPE TOOLS



PIPE CUTTERS

"ARMSTRONG BROS." Three Wheel and Standard wheel and roller Pipe Cutters are quality cutters throughout . . . built to give years of good service.

"ARMSTRONG BROS." drop forged Pipe Cutters are built for lifetime service with 1-piece drop forged steel heat treated body and a replaceable hardened steel nut to take up the wear and thrust of handle screw. Used either as 1-wheel (with 2 rollers) or 3-wheel (for close quarters).

"ARMSTRONG BROS." Knife Blade Cutter Wheels are machined from special alloy tool steel properly heat treated. They cut rapidly and easily, hold their keen edge.

Write for Catalog

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
5204 W. ARMSTRONG AVE. • CHICAGO 30, ILL.

miles, 8-in., proposed, Sinclair, Wyo., to Salt Lake City, Utah.

Progress Pacific Pipe Line Co.—900 miles, 10-in., proposed, California to West Texas.

Salt Lake Pipe Line Co.—Proposed, Pasco, Wash., to Puget Sound.

330 miles, 8-in., planned, Salt Lake City, Utah, to, Boise, Idaho. Completion date 12-1-52.

Shell Oil Co.—565 miles, 8-14-in., planned Wood River via East Chicago to Detroit; 35 miles, 14-in. Completion date summer of 1952.

Sinclair Pipe Line Co.—10-in., Houston to Baton Rouge; 16-in., Kalamazoo to Detroit; 20-in., Marcus Hook to Bayonne, N. J.; East Chicago to South Bend, Ind.

8-10-in., planned, Sinco to Port Arthur, Tex.

Standard Oil Co. (Ind.).—316 miles, 12-in., proposed, Sugar Creek refinery to Dubuque, Iowa. Completion date 1-1-53.

122 miles, 8-in., under way, Neodesha, Kans., to Belton, Mo. Bills & Troth Construction Co., Carl Bills, superintendent at Armory Building, Neodesha. Completion date 1952.

Standard Oil Co. (Ohio).—17 miles, 6-in., authorized, Toledo to West Toledo, Ohio.

Sun Pipe Line Co.—110 miles, 8-in., under way, Fostoria to Hudson, Ohio.

Susquehanna Pipe Line Co.—123 miles, 6, 8-in., proposed, Fostoria to Randolph, Ohio.

Tuscarora Oil Co.—74 miles, 6-10-12-in., under way, Allentown to Midland, Pa.

United States Pipe Line Co.—1,000 miles, proposed, Gulf Coast via Memphis, Nashville, Tenn., Lexington, and Paducah, Ky., to Cincinnati, Ohio.

Natural-Gas Pipe Lines

Algonquin Gas Transmission Co.—140 miles, 24-26-in., under way, New Jersey to Connecticut River near New Haven. Williams Brothers, contractor. Robert L. Buck, project manager, Danbury, Conn. Spreadmen: Thelmer Davis, Waterbury, Conn., O. L. Martin, Sloatsburg, N. Y., O. R. Mitchell, Danville, N. J. Completion date 8-1-52.

253 miles, 24-36-in., under way, Lambertville, N. J., to Boston area, Williams Brothers, contractor. Completion date 9-1-52.

270 miles, under way, New Jersey, Connecticut, Rhode Island, and Massachusetts. Completion date 9-1-52.

Allied Gas Co.—24 miles, 6⅝-in., proposed, McLean to Champaign County, Illinois.

Arkansas-Missouri Power Co.—140 miles, 2-10-in., planned, Arkansas and Missouri.

Associated Natural Gas Co.—88 miles, authorized, Missouri.

Carolina Natural Gas Corp.—185 miles, 2-12-in., proposed, lateral lines off Transcontinental in North and South Carolina.

Cities Service Gas Co.—179 miles, 4-30-in., gathering system in vicinity of Ulysses, Kans. Vaughn & Taylor Construct. Co., Inc. D. D. Vaughn, spreadman, Ulysses.

21 miles, 26-in., proposed, Franklin and Anderson counties, Kans.

15 miles, 20-in., Craig County, Oklahoma, to Lawrence County, Missouri.

Coast Counties Gas & Electric Co.—40 miles, 3, 4, and 8-in., planned. Coast and Valley region, California.

Colorado Interstate Gas Co.—250 miles, 20-in., under way, Kit Carson, Colo., to Amarillo, Tex. R. H. Fulton & Co., contractor. Jerry Nash spreadman at Lamar, Colo.

16 miles, 4-in., Pueblo County to Fowler, Colo.

Commonwealth Natural Gas Corp.—537 miles, 20-in., proposed, West Bend, Ky., to Norfolk, Va.

Dow Chemical Co.—70 miles, various sizes, Midland, Saginaw, and Bay City, Mich. Mahoney Contracting Co., contractor. Ralph Bucher, spreadman at Midland.

East Tennessee Natural Gas Co.—172 miles, 22-in., authorized, Greenbrier to Oak Ridge, Tenn.

100 miles, 16-in., proposed, Knoxville to Kingsport, Tenn.

El Paso Natural Gas Co.—133 miles, 30-in., proposed, looping along main line in Texas, New Mexico, Arizona.

36 miles, 24-in., proposed, looping from Kingman to Franconia, Ariz.

Equitable Gas Co.—17 miles, 16-in., under way, near Pittsburgh, H. L. Gentry Const. Co., contractor. Lavern Curtis, spreadman at Sewickley, Pa.

Frederick Gas Co.—26 miles, 4-in., planned, Redlands to Frederick, Md.

Georgia Gas Co.—32 miles, 4½-in., proposed, Bogart to Gainesville, Ga.

Glacier Gas Co.—285 miles, 20-in., proposed, Kalispell, Mont., to Spokane, Wash.

120 miles, 16-in., proposed, Spokane to Hanford, Wash.

91 miles, 8⅝-in., proposed, Spokane to Lewiston, Idaho.

130 miles, 12¾-in., proposed, Spokane to International boundary at Trail, British Columbia.

Grand Valley Pipe Line Co.—105 miles, 8-10-in., planned, Piceance Creek field to Rifle on to Grand Junction, Colo.

Gulf Interstate Gas Co.—1,000 miles, 30-in., planned, Gulf Coast to North Kentucky.

Home Gas Co.—32 miles, 12-in., authorized, Breesport to Union Center, N. Y.

17 miles, 12-in., proposed, loops from Hancock to Sanford, N. Y.

Hope Natural Gas Co.—33 miles, 8-10-12-in., planned, Wyoming County, West Virginia, south to Buchanan County, Virginia.

Iowa-Illinois Gas & Electric Co.—41 miles, 10-in., authorized, Washington County to Cedar Rapids, Iowa.

¾ to 6-in., under way, Davenport, Iowa, and Moline, Ill. C. E. Wilson Const. Co.

Kansas-Nebraska Natural Gas Co., Inc.—179 miles, proposed, Kansas and Nebraska.

20 miles, 16-12-in., planned, Hastings to Grand Island, Neb. Completion date 1952.

18 miles, 6-8-in., planned, McCook, Neb., south. Completion date 1952.

54 miles, 4-6-in., planned, Neligh to Hartington, Neb. Completion date 1953.

49 miles, 10-in., planned, Ogallala to North Platte, Neb. Completion date 1952.

20 miles, 12-in., planned, Atwood to near Oakley, Kans. Completion date 1952.

Kansas Power & Light Co.—27 miles, 20-in., authorized. Pratt, Kans., to Calista compressor station.

28 miles, 12-16-in., planned, north of Kansas to Meade County gas field.

Lake Shore Pipe Line Co.—45 miles, 10¾-in., authorized, northwesterly from T.G.T. system near Meadville, Pa., to Ashtabula, Ohio.

Lone Star Gas Co.—100 miles, proposed, storage fields to the Dallas-Fort Worth area. 35 miles, 12-in., proposed, southeastern Schleicher County.

Manufacturers Gas Light & Heat Co.—40 miles, proposed, Allegheny, Washington, and Beaver counties, Pennsylvania.

Michigan Gas Storage Co.—93 miles, 16, 22, 24-in., under way, Laingsburg to near Pontiac and Mount Clemens, Mich. (Includes 17 miles of lateral lines.) Mahoney Contractor. Completion date 6-52.

30 miles, 26-in., authorized, looping between Laingsburg and Mount Pleasant Junction, Mich.

Michigan Gas Utilities Co.—77 miles, under way, Sturgis, Hillsdale, and Coldwater, Mich. (22.7 miles, Marshall south to Coldwater; 20 miles, Coldwater easterly to Hillsdale; 22.5 miles, Hillsdale to Sturgis, 11 miles, Hillsdale to Jonesville.) Somerville Const., contractor, Jim Godwin at Coldwater.

MidSouth Gas Co.—240 miles, proposed, Greene, Poinsett, Crittenden, St. Francis, Lee, Phillips, Monroe, Woodruff, and Cross counties, Arkansas.

Minneapolis Light & Power Co.—20 miles, 30-in., under way, Minneapolis, Williams Brothers, contractor. F. W. Caldwell, spreadman.

Mississippi River Fuel Corp.—98 miles, 16- and 18-in., authorized, feeder line from Lincoln Parish, Louisiana, to Waskom field, Harrison County, Texas.

40 miles, 18-in., authorized, Dubach to Perryville, La.

Missouri Central Gas Co.—25 miles, 6-in., contracted, Moberly to Macon, Mo. L. R. Young Const. Co.

Montana Power Co.—52 miles, 16-in., authorized, Canada - Montana border to Cut Bank, Mont.

Morganfield Natural Gas Co.—31 miles, 4-6-in., proposed, through Sturgis, Providence, Clay, Diamond, Wheatcroft, and Sullivan, Ky.

National Utilities Co. of Michigan.—76.7 miles, 20-in., proposed, South Central Michigan. (22 miles from near Marshall south to Coldwater; 20 miles east of Hillsdale; 22 miles southwest to Sturgis; 5 miles from Hillsdale to Jonesville and 8 miles west to Union City.)

Nevada Natural Gas Pipe Line Co.—114 miles, 10-in., proposed, Topock, Ariz., to Las Vegas, Nev.

New River Gas Co.—50 miles, planned, Summers to Monroe counties, West Virginia, to Narrows and Dublin, W. Va.

New York State Natural Gas Corp.—104 miles, 14, 16, 20-in., authorized, looping on Westmoreland, Armstrong, and Tioga counties, Pennsylvania. (Includes 17 miles, 16-in., in Potter County, Pennsylvania, and 21 miles 14-in., replacement in Line No. 507, New York.)

12 miles, 20-in., under way, looping at Zelienople, Penn. Williams-Austin Co. Ralph Gaddy, superintendent. 5-15-52.

52 miles, 16-in., contracted, Utica to Amsterdam, N. Y. (to begin at completion of Zelienople). Williams-Austin. Ralph Gaddy, superintendent. Completion in 90 days.

20 miles, 20-in., begin 5-1, Cayuta Gate to Ithaca, N. Y. Williams-Austin Co. Howard Bauer, superintendent. Completion date 6-30-52.

30 miles, 20-in., contracted, Angelica to Rossburg, N. Y. (begin at completion of Cayuta - Ithaca). Williams - Austin. Howard Bauer, superintendent. Completion in 45 days.

17 miles, 16-in., contracted, Colesburg Junction to Sabinsville, Pa. (begin at completion of Angelica job). Williams-Austin. Howard Bauer, superintendent.

21 miles, Columbiana and Stark counties, Ohio.

Niagara Mohawk Power Corp.—55 miles, 10-in., Fulton to Watertown, N. Y.; Williams-Austin Co., contractor. Howard Bauer, superintendent. Completion date 9-52.

Northeastern Gas Transmission Co.—221 miles, 20-24-in., authorized, New Hampshire, Massachusetts, and Connecticut.

Northeastern Gas Co.—411 miles, proposed, New England towns.

Northern Natural Gas Co.—580 miles, proposed, Kansas, Texas, Oklahoma, and Nebraska loops.

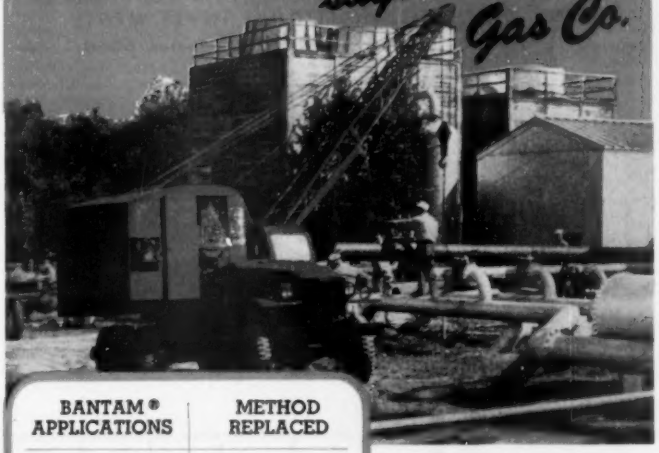
210 miles, 26-in., proposed, five loops in Texas-Oklahoma area, two in Kansas, and two in Nebraska.

400 miles, 24-in., proposed, Emerson, Manitoba south to Red River Valley through Fergus Falls on to St. Paul, Minn.

Northern Indiana Fuel & Light Co.—33 miles, 8-in., proposed, Edgerton to Auburn, Ind.

Northwest Natural Gas Co.—750 miles, planned, Washington, Oregon, and Idaho.

"INDISPENSABLE TOOL for our jobs" says Ohio Fuel Gas Co.



BANTAM® APPLICATIONS	METHOD REPLACED
Installing compressor units	Truck and high lift
Unloading pipe and materials	Contracted equipment
Aligning pipe and fittings	"A" frame, chain falls, etc.
Excavating for leak repairs	2 to 3 men and truck
Uncovering short line sections	Trencher or hand digging
Lowering pipe into trench	Side-boom tractor, etc.
Back filling trench	Hand, dozer or slip board

NOTE: Bantam crane lifts 10,000 lbs. . . . works with 25' to 50' boom . . . quickly convertible to Back Hoe, Backfiller, etc.

Because of Schield Bantam's low price, big work capacity and high speed mobility — on or off highway— Ohio Fuel Gas Co. is *now using ten of these versatile truck-mounted machines,* with fast-change attachments, to reduce construction and maintenance costs. Why not investigate Bantam economy for your excavating and lifting jobs — today!

CLIP . . . MAIL TODAY!

SCHIELD BANTAM CO.
243 Park St. Waverly, Iowa

☐ Send details on truck-mounted BANTAM ☐ Crane ☐ Back Hoe

Name_____
Title_____
Company_____
Address_____
City_____ State_____
SB-CR-5

Look!

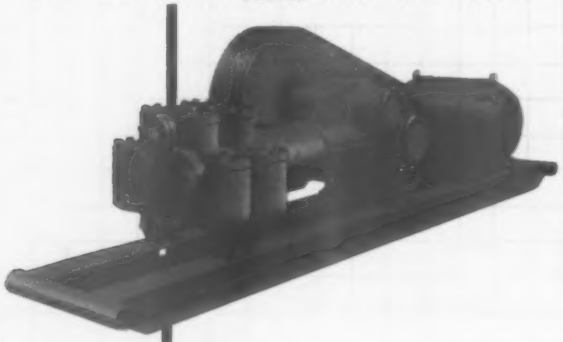
Includes 25' boom, 12" block, 2 part line and extra counterweight — less truck and mounting charge. F. O. B. Waverly, Ia. Price subject to change.

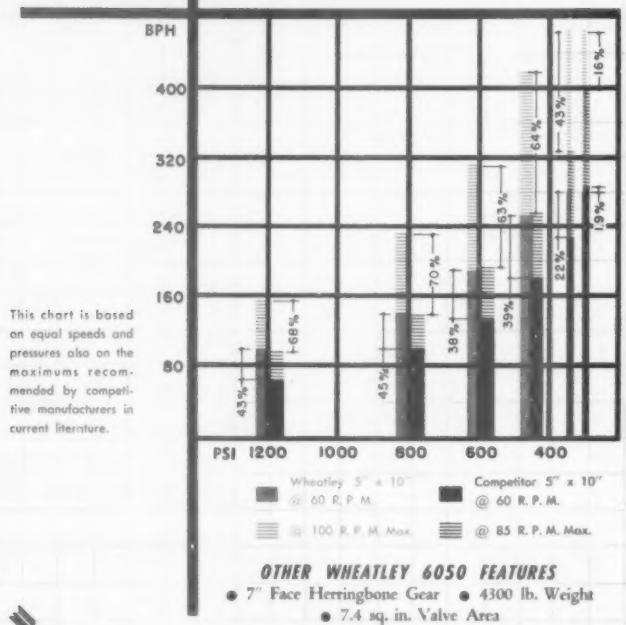
Bantam crane sells for less than $5800

SCHIELD BANTAM
Cranes • Excavators
Get more jobs done at lower cost

40% GREATER VOLUME!

FOR ONLY 10% ADDITIONAL INVESTMENT
WITH WHEATLEY'S **NEW** 5"X10" Series 6050





This chart is based on equal speeds and pressures also on the maximums recommended by competitive manufacturers in current literature.

OTHER WHEATLEY 6050 FEATURES

- 7" Face Herringbone Gear
- 4300 lb. Weight
- 7.4 sq. in. Valve Area
- Crank Pin 4" Diameter 3½" Base
- 8500 lb. Plunger Load
- Round Valve Covers
- 1½" Piston Rod Diameter
- Plus Three Decades of Engineering Design and Experience

FRANK WHEATLEY
PUMPS & VALVES
TULSA 8, OKLAHOMA

Distributing offices located:
TULSA, OKLAHOMA CITY, SEMINOLE, BARTLESVILLE, OKLAHOMA — HOUSTON, DALLAS, ODESSA, TEXAS — SHREVEPORT, LOUISIANA — SAN FRANCISCO, CALIFORNIA

373 miles, 24-in., proposed, Eastport, Idaho, to Monroe, Wash.

79 miles, 18-in., proposed, Monroe to International boundary near Lynden, Wash.

29 miles, 22-in., proposed, Monroe to near Seattle, Wash.

164 miles, 20-in., proposed, Seattle to Portland, Ore.

Ohio Fuel Gas Co.—31 miles, 20-in., authorized, Licking County to Richland County, Ohio.

22 miles, 16-in., authorized, Dayton, Troy, Piqua, and Sidney, Ohio.

23 miles, 16-20-in., authorized, Wellington to Elyria, Ohio; 16 miles, 20-in., authorized, Benton Station to Crawford Station. 18 miles, 20-in., Crawford Station to near Columbus. 16 miles, 16-in., authorized, Berlin to Sandusky, Ohio.

74 miles, 3 to 20-in., authorized, Hocking, Knox, and Ashland counties, Ohio.

47 miles, 20-in., authorized, Benton Township, Hocking County, to Columbus, Ohio.

61 miles, authorized, northern and southwestern Ohio.

33 miles, 20-in., proposed, Jefferson to Seneca, Ohio.

Pacific Gas & Electric Co.—44 miles, 8-in., under way, Salinas to King City, Calif. W. M. Lyles and company crews. Completion date 6-10-52.

141 miles, 34-in., proposed, parallel sections along Topock-Milpitas line.

10 miles, 10-12-in., authorized, Monterey to Fort Ord to Castroville; 12 miles, 16-in., Napa Wye to Shellville; 6 miles, 12-in., Cotati to Santa Rosa, Calif.

Pacific Northwest Pipeline Corp.—26-in., Alberta fields through to Pincher Creek, Spokane, Hanford, Vancouver, and Portland.

Panhandle Eastern Pipe Line Co.—70 miles, 24-26-in., under way, looping from Sneed, Tex., to Emporia, Kans.

174 miles, 30 and 26-in., contracted. Tuscola, Ill., eastward—looping present system; R. A. Conyes, contractor.

44 miles, 26-in., Edgerton, Mich., Anderson Brothers.

22 miles, 30-in., looping in Tuscola, Ill.

45 miles, 30-in., looping in Montezuma, Ind.

63 miles, 30-in., looping in Zionsville, Ind.

Pennsylvanian Gas Co.—52 miles, 12-in., between Warren and Erie, Pa. Section 1—27 miles, under way and contracted by Harford Brothers. Section 2—25 miles.

Peoples Natural Gas Co.—25 miles, proposed, Cambria and Blair counties, Pennsylvania.

Permian Basin Pipeline Co.—384 miles, 20-30-in., proposed, Permian basin area to eastern New Mexico.

139 miles, planned, Upton County, Texas, to Lea County, New Mexico.

76 miles, planned, Lea County to Roosevelt County, New Mexico.

169 miles, planned, Roosevelt County, New Mexico, to Carson County, Texas.

Phillips Petroleum Co.—268 miles, 30-in., underway, gas gathering system, Midland and Glasscock counties, Texas, Vaughan & Taylor Const. Co., D. D. Vaughan, Odessa, Tex.

Prince George's Gas Corp.—20 miles, 22-in., authorized, between Chillum and Rockville, Md.

Public Service Co. of Colorado.—95 miles, proposed, Douglas Creek and other gas fields to Grand Junction, Colo., area.

Public Service Co. of North Carolina.—33 miles, 10-in., authorized, Burlington to Chapel Hill, N. C.

16 miles, 8-in., authorized, Chapel Hill to Raleigh, N. C., completion date 7-1-52.

29 miles, 4-in., authorized, Statesville to Kanapolis, N. C. Completion date 7-1-52.

83 miles, 8-in., authorized, Kings Mountain to Ashville, N. C. Completion date 3-1-53.

Rockland Light & Power Co.—22 miles, 8-in., proposed, Orangetown to Tompkins, Cove, N. Y.

South Georgia Natural Gas Co.—339 miles, 2-12-in., proposed, Florida and Georgia.

Southern California Gas Co.—35 miles, planned, Antelope Valley, California.

Southern California Gas Co. and Southern Counties Gas Co. of California.—45 miles, 30-in., proposed, looping on line from Arizona border to Los Angeles.

81 miles, 30-in., proposed, Whitewater to Desert Center, Calif.

Southern Natural Gas Co.—21 miles, 24-in., authorized, Perryville Station, La., to Boeuf River.

14 miles, 24-in., authorized, Onward Station, Miss., to Big Sunflower River.

14 miles, 14-in., authorized, Perryville Station, La., to Wilhite Gate.

375 miles, 24-in., planned, Gwinville, Miss., to Atlanta, Ga.

169 miles, proposed loops, Ouachita Parish, Louisiana, to Augusta, Ga.; 20 miles in Ouachita Parish, 33 miles in Ouachita and West Carroll parishes; 7 miles, Sharkey County, Mississippi; and 108 miles, 14-in., Bass Junction to Augusta, Ga.

Southern Union Gas Co.—21 miles, 20-in., authorized, Albuquerque, N. M.

27 miles, 10-in., authorized, Lea and Eddy counties, New Mexico.

30 miles, 12-20-in., contracted, San Juan County, New Mexico. R. H. Fulton & Co.

Southwest Gas Corp., Ltd.—26 miles, proposed, from P.G.&E. line to Victorville, Calif.

Tennessee Gas Transmission Co.—591 miles, 24-30-in., proposed, looping along present system (consisting of 323 miles of 30-in.; 167 miles of 26-in.; 101 miles of 24-in.)

420 miles, 30-in., Texas, Louisiana, Arkansas, Mississippi, Tennessee, and Kentucky.

101 miles, 26-in., Kentucky and Ohio.

304 miles, 24-in., proposed, Mercer, Pa., to Utica, N. Y.

250 miles, miscellaneous laterals.

116 miles, 30-in., three loops, Refugio to Cleveland, Tex.; Ed Flanagan, Victoria, Tex.

80 miles, 26-in., contracted, Harrison County to Jackson County, Ohio. H. C. Price Co., contractor.

24 miles, 26-in., contracted, Carrollton, Ohio, southwestward to Harrison County, Ohio. H. C. Price Co., contractor.

56 miles, 26-in., contracted, Athens, Ohio, to Jackson County, Ohio. H. C. Price Co., contractor.

Texas Eastern Transmission Corp.—791 miles, 30-in., under way, Kosciusko, Miss., to Connellsville, Pa.

Section 8, 77 miles, 30-in., under way, Portsmouth to Amesville, Ohio. Anderson Brothers Corp.

Section 9, 74 miles, 30-in., under way, Amesville to Ohio-West Virginia river crossing. Anderson Brothers Corp.

Section 10, 66 miles, 30-in., under way, Ohio River to Connellsville, Pa. Anderson Brothers Corp.

80 miles, 30-in., underway, Columbia, Ky., to Kentucky River, N. A. Saigh Co., Inc., Carl Doyle, Danville, Ky.

315 miles, 24-in., proposed, Provident City, Tex., to Castor, La.

Texas Gas Transmission Corp.—408 miles, 26-in., proposed, looping from Bastrop to Hardinsburg, Ky.

223 miles, 26-in., proposed, Bastrop, La., to Covington, Tenn.

47 miles, 26-in., proposed, northeastward from Covington.

49 miles, 26-in., proposed, northeastward from Kenton, Tenn.

45 miles, 26-in., proposed, northeastward from Calvert City, Ky.

25 miles, 26-in., proposed, northeastward from Slaughters, Ky.

19 miles, 26-in., proposed, southwestward from Jeffersontown, Ky.

180 miles, 26-in., authorized, Acadia Parish to connection with existing facilities in Morehouse Parish.

35 miles, 12-in., authorized, Slaughters, Ky., to Evansville, Ind.

195 miles, 26-in., proposed, Gulf Coast region to southwestern Louisiana.

560 miles, 26-in., proposed, Louisiana and Kentucky.

Texas-Ohio Gas Co.—1,350 miles, 30-in., proposed, Hidalgo County, Texas, through Arkansas, Mississippi, Tennessee, and Kentucky on to Spencer, W. Va. Completion date 6-30-53.

Union Oil Co. of California.—40 miles, 8-10-in., planned, San Joaquin Valley and Los Angeles basin.

United Fuel Gas Co.—32 miles, 20-in., under way, Lanham to Broad Run, W. Va. H. L. Gentry Construction Co., contractor. Frank Morris, spreadman at Charleston, W. Va.

United Gas Pipe Line Corp.—70 miles, 30-in., underway, Houston to So. Bank of Trinity River, Tex., Louis Visentine, Conroe, Tex.

510 miles, 20 to 30-in., under way, Agua Dulce, Tex., to Monroe, La. River Const. Corp., contractor.

Spread 1, 51 miles, 30-in., from Pearl River north and south of Jackson, Miss. Red Tatom, superintendent at Jackson.

Spread 2, 45 miles, 30-in., McComb to Pearl River south of Jackson. Merle Tatom, superintendent at Hazelhurst.

Spread 3, 30 miles, 30-in., Kosciusko south toward Jackson. Jimmy Reed, superintendent at Kosciusko.

Spread 4, 29 miles, 12-in., Lafayette to Jeanerette, La. Roy Earnhart, spreadman at Jeanerette.

124 miles, Sterlington compressor station, near Monroe to Jackson, Miss.

23 miles, 8-12-16-in., South Louisiana facilities.

53 miles, 24-in., authorized, Texas.

36 miles, proposed, offshore from Ingleside to near Refugio, Tex.

All contracted by River Const. Corp., a joint venture including Oklahoma Contracting Co.; J. Ray McDermott & Co., Inc., and Morrison-Knudson. Inspection by Brown & Root, Inc.

Virginia Natural Gas Co.—153 miles, Buckingham to Richmond and Portsmouth, Va.

Western Kentucky Gas Co.—2 to 4-in., under way, additions to present system; Modern Welding Co., Inc., contractor.

Western Pipe Lines.—1,200 miles, 22-in. planned, southern Alberta to Duluth, Minn.

West Texas Gas Co.—27 miles, 10-in., authorized, Lubbock to Abernathy, Tex.

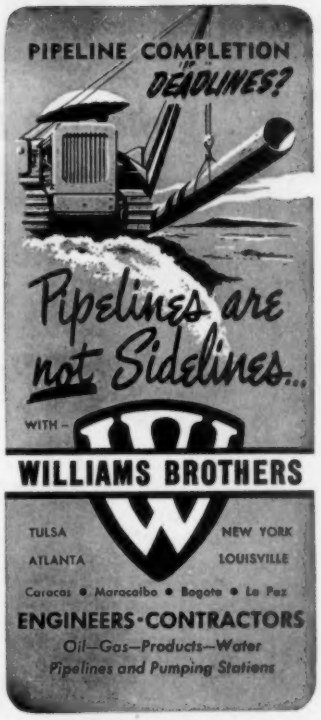
Wilcox Trend Pipe Line Co. (Harry Bass Drlg. Co.)—150 miles, various up to 20-in., planned, gathering system for delivery to proposed Texas Eastern terminal at Provident City, Tex.

Foreign Crude-Oil Pipe Lines—Planned and Under Way

Alberta-Vancouver Oil Pipe Line Co.—(Brokaw, Dixon, McKee).—972 miles, 16-in., proposed, Edmonton via Pincher Creek Alta., Idaho and Washington states to Vancouver, B. C.

Cia. de Petroleo Ganso Azul, Ltd.—48 miles, 4-in., planned, Ganzo Azul field to Pucalpa on upper Ucayali River, Peru.

Condor.—90 miles, 12-in., under way, Genoa to Rho, near Milan, Italy. Soc. Ital. Condotte Acqua Montubi, contractor. Completion date 7-31-52.



S. E. HUEY & CO.
ENGINEERS & SURVEYORS
HENINGER BLDG.
MONROE, LA.

SURVEYING & MAPPING

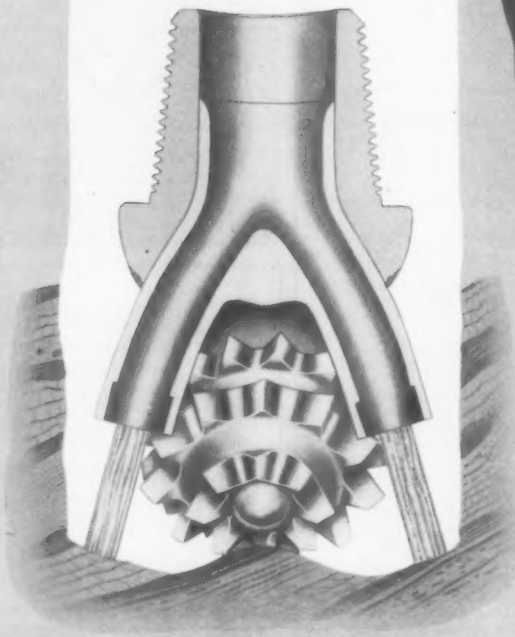
PIPE LINE SURVEYS

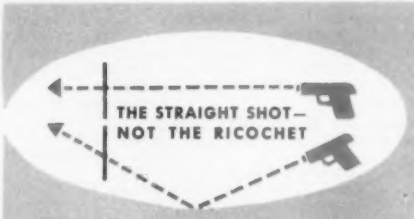
NEW PIPE
"FASTER from FOSTER"
STANDARD • MERCHANT
LAP WELD • SEAMLESS
BUTT WELD • SPIRAL WELD
Substantial stocks in 5 Foster Warehouses can fill most requirements. Call on FOSTER for all your pipe needs.
RAILS-TRACK EQUIPMENT • PILING • WIRE ROPE
L.B. FOSTER CO.
HOUSTON 2, TEX.
CHICAGO 4, ILL.
PITTSBURGH 30, PA.
NEW YORK 7, N.Y.

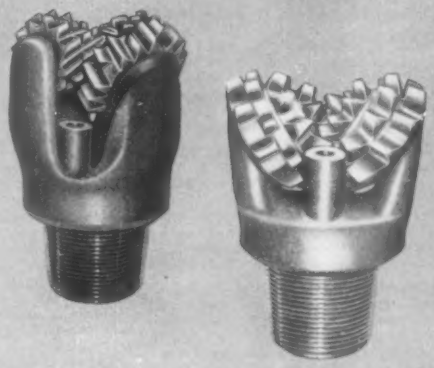
H. C. SMITH "Jet-Action" BITS

hit the bottom of the hole... not the walls!

this cutaway shows why







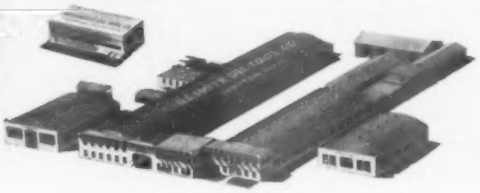
THIS cross-section of an H. C. Smith jet-action bit clearly shows how the angle of the nozzles directs a powerful stream downward, against the bottom of the hole. The scientifically engineered shape of the water course diverts and divides the mud flow with minimum change of direction, practically eliminating turbulence, and allowing the mud stream to hit the bottom with maximum force, flushing away the cuttings and keeping the teeth on bottom. That's why these bits produce such excellent footage.

H. C. Smith jet-action Rock Bits with tungsten-carbide inserts, indicated in black in the illustration, are known as the "Hydro-Jet" series. Their slightly higher price is reflected in longer life, since these nozzle inserts will outlast the bit teeth.

H C Smith
OIL TOOL CO.
GENERAL OFFICES, EXPORT OFFICE AND PLANT
COMPTON, CALIFORNIA

BRANCHES IN ALL PRINCIPAL OIL CENTERS
IN THE UNITED STATES AND CANADA

This Plant makes BITS... and nothing but BITS!



Among the

Drilling Contractors

Denver Company Drills In Southern Oklahoma

Westbury Drilling Co., Inc., headquartering at Denver, now is operating two rotary rigs in the Ardmore district of southern Oklahoma. One is on a joint account well which this company and Ashland Oil & Refining Co. are drilling in the Aylesworth pool, in Marshall County. The other is under contract to Davidor & Davidor of Oklahoma City for a 6,400-ft. test in Stephens County.

The southern Oklahoma operations are under the immediate supervision of Alva C. Davis, vice president in charge of the company's Ardmore office in the Von Weise Building. The company is headed by Russell P. Johnson, president, who is in charge of its main office in the First National Bank Building, Denver. It also maintains an office at 122 East 42nd Street, New York, where R. Quattrocchi, another vice president is located.

E. B. Clark Drilling Co., Wichita Falls, Tex., is drilling for Alexander Goldsmith at 1-A Kempner, a projected 5,000-ft. test for the area northwest of Holliday, Wichita County, North Texas.

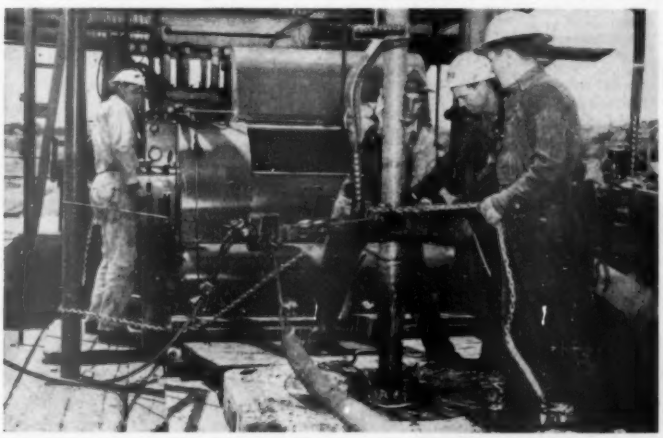
Howell-Holiday-Howell Drilling Co., Dallas, has a heavy-duty rotary rig working for Deep Rock Oil Corp. at a wildcat location 2 miles north of Valdosta, Collin County, Texas. The test, 1 Sherley, is scheduled to go to 9,000 ft. It is the county's only active exploratory test.

Pike Drills Directionally At Two Long Beach Wells

Thomas P. Pike Drilling Co., Los Angeles, has two directional drilling jobs under way within the Long Beach city limits. Both are for Richfield Oil Corp. under contracts. One is the latter company's 1 Hodges community, on which Earl Kirkland is tool pusher. The other is 1-E Recreation Park with Mitt Lynch as tool pusher. Operating in populated areas, both rigs are fully sound-proofed.

Delaware Drillers, Inc., San Angelo, Tex., is starting an Ellenburger exploratory test about a mile southwest of San Angelo city limits in Tom Green County, West Central Texas. The well, 1 Nasworthy, is being drilled under contract for L. E. Sherck and E. M. Wahlenmaier. Objective is expected around 6,600 ft.

Schoenfeld - Hunter - Kitch Drilling Co., Odessa, Tex., has two deep wildcat operations under way for Phillips Petroleum Co. in Andrews County,



MAKING UP... G. E. Wilson (driller) at the controls with (left to right) W. L. Carr, Ray Woods, and Ralph Richards, day-tour crew for Nelson Drilling Co., Ardmore, Okla., going in the hole on a well being drilled for Seaboard Oil Co. in the North Tatum field, Stephens County, southern Oklahoma.

You will pull fewer drill strings because of joint failure if you use 'Bestolife Lead Seal Tool Joint and Casing Compound. Standard of the oil industry for 20 years. Unconditionally guaranteed. Sold and exported by supply houses throughout the world.

I. H. GRANCELL
1601 EAST NADEAU STREET
LOS ANGELES 1, CALIFORNIA

on the world's
BIGGEST
wire rope jobs...

experienced riggers demand
GENUINE
CROSBY
CLIPS

Drop-forged, hot-dip galvanized wire rope fasteners
• SIZES FOR ALL WIRE ROPE •
DISTRIBUTORS EVERYWHERE

AMERICAN HOIST & DERRICK CO.
ST. PAUL 1, MINNESOTA

Hold High Pressures

WITH GUIBERSON HIGH PRESSURE STRIPPERS

TYPE "JUS" HIGH PRESSURE STRIPPER
Incorporates slip and bowl with packing gland.

Both types made for 2", 2½" or 3" tubing.
Also may be used for 1", 1¼" and 1½" macaroni strings.
Can be furnished with 6" series 400, 600 or 900 or 8" series 400 bottom flange.

TYPE "JU" HIGH PRESSURE STRIPPER
Flat top of packing gland accommodates Guiberson Type "B" tubing spider.

For running or pulling tubing under pressure, for clean-out work using reverse circulation—for *any* heavy-duty job where efficiency and success depend on a non-rotating high pressure stripper—Guiberson has the answer at low cost.

- 2 Models—"JU" without slips
  —"JUS" with slips
- Tubing collars pass without leakage!
- 3-inch adjustment on packing rubber!
- Rubbers can be changed without taking stripper from well head!
- Slips hold tubing fast but won't stick in bowl!

GUIBERSON

Better Be Safe Than Sorry!

PULL FASTER and EASIER

Simplex Center-Hole Jennies use hydraulic power for quicker pulling of valve seats, gears, wheels—scores of other oil field jobs. Operate in any position; light weight, quickly set up. 6 models: 30 to 100 ton Capacities.

Simplex LEVER • SCREW • HYDRAULIC Jacks

Send for Bulletin: Oil 49

TEMPLETON, KENLY & COMPANY
1034 South Central Avenue, Chicago 44, Illinois

Standco
NO-SMOKE

STANDCO BRAKE LINING

For the easiest brake known. It feeds off evenly. Standco never scores brake rims. See pages 3608-3613, Composite Catalog.

Standco Brake Lining Co.
HOUSTON

POSITIVE OIL SHOW IDENTIFICATION

with MINERALIGHT Ultra-Violet (black light)

Don't pass up possible pay! Make positive core identification checks with new model MINERALIGHT SL long wave ultra-violet lamp.

PROVED BEST BY TEST FOR OIL SHOW ANALYSIS! Simple to operate. Lamp weighs only 1 lb. Models available for 110 volt AC or with adapter, 110 volt DC current. Battery operated model for field use holds lamp, has built-in viewer for daylight examination. Easily portable. Send for FREE brochure OG, "How to detect and analyze petroleum in oil surface samples with ultra-violet".

ULTRA-VIOLET PRODUCTS, Inc.
145 Pasadena Avenue, South Pasadena, Calif.

West Texas. One, projected to 11,000 ft., is 2 "EE" University, 22 miles southwest of Andrews. The other, projected to 11,200 ft., is 1 "FF" University, east of the Embar field.

L. H. & S. A. Olson Drilling Co., Midland, Tex., is keeping a rig working for Standard Oil Co. of Texas in the Neva West field, Schleicher County, West Texas. Current operation, just started, is 3-3 Wilson, at the north end of the field.

A. R. Dillard, Wichita Falls, Tex., is drilling on a 7,200-ft. contract for Russell Maguire at a wildcat location, 1 Whitehead, 5 miles northwest of Sunset, Montague County, Texas. Location is in the W. Bond Survey.

Lyle Cashion, Inc., Jackson, Miss., is drilling a 7,000-ft. Wilcox test for Kirby Petroleum Co. at a wildcat location 2 miles north of the Wayside field, Adams County, Mississippi. Location is for 1 Edward Fletcher estate, in 46-6n-2w.

Loffland Brothers Co., Tulsa, has operations under way at Phillips Petroleum Co. 1-J Texas University, a wildcat test located 21 miles southwest of Andrews, Andrews County, West Texas. Contract is for 11,850 ft.

Thompson-Carr Drilling Co., Houston, is drilling for Sinclair Oil & Gas Co. at 1 Grady Scott, an Ellenburger exploration test, located in Section 101-M-EL & RR Survey, 10 miles north of Lamesa, Dawson County, West Texas. Hole is scheduled to go to 12,700 ft.

Dorris Ballew, Inc., Natchez, Miss., has a new operation under way in Franklin County, Mississippi. It is G. A. Clements 1 Magee, in 35-5n-2e, 2 miles southeast of Bunkley and 3 miles southeast of the Knoxville Tower field. Contract is for 7,000 ft.

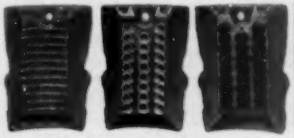
ACTIVE ROTARY RIGS*
(United States and Western Canada)

Area—	Week ended 6-9-52	Change week ended 6-2-52	Change week ended 6-11-51
Gulf Coast	615	—12	+ 42
N. & W. Tex.-N. M.	981	+ 5	+100
Ark.-N. La.-E. Tex.	150	+ 4	— 4
Oklahoma	323	+ 4	+ 54
Kansas-S. Nebraska	170	—16	— 10
Illinois-Eastern	163	+13	+ 10
Rocky Mountains	242	+ 7	+ 88
Pacific Coast	169	+ 1	+ 29
Total U. S.	2,813	+ 6	+309
Western Canada	181	+ 3	+ 48
Total	2,994	+ 9	+357

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States and the Rocky Mountains and Western Canada areas are shown on pages 440 and 441.

VARCO

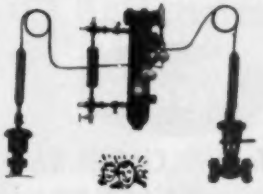
CASING SPIDER — AND ELEVATOR SEGMENTS WITH 'VARCO' BUTTONS



"Varco" buttons, popular for years in rotary drill pipe slips, proved satisfactory and have been adopted and are installed in segments of automatic casing spiders and elevators of various makes. Wickers are removed and holes bored for a maximum number of VARCO casing buttons, to assure uniform and maximum gripping area. Converting buttons for the next smaller casings are available. Write for complete descriptive data.

Abegg & Reinhold Co.
2533 EAST 26TH STREET
LOS ANGELES 11, CALIFORNIA
1502 Maury St., Houston 10
418 S.E. 29th St., Oklahoma City 9
356 No. Wolcott St., Casper, Wyo.
P. O. Box 748, Odessa, Texas

INFERNO
Boiler Safety Units



Will Make Your Men HAPPY

For Protection Against explosions, and the burning and dropping of crown sheets, the INFERNO Boiler Safety Unit can't be beat. Ask anyone who uses one. Provides POSITIVE safety action in 3 ways. Write for Bulletin 15-B for full details. Sold through your favorite supply store or direct.

The INFERNO CO.
Box 1138A
115 RICOU St.
SHREVEPORT, LA.

There's nothing like a VOSS VALVE

to make good compressors operate better

to make worn compressors operate like new!

It is a matter of record that every time an ordinary compressor valve is replaced with a specially designed VOSS valve, the immediate result is increased efficiency and greater output . . . and this record covers thousands of installations.

VOSS VALVES are made to specifications for all types of air, gas and ammonia compressors; from 1" to 16" in diameter and for pressures from minus 27HG to 7,500 pounds and for speeds up to 1,000 rpm and above.

VOSS VALVES are machined from solid stock (not cast)—PLATES are machined and ground (not press formed) for precise high-tolerance fit; VALVES and PLATES are of heat-treated alloy and stainless steel; the PLATES are dimensionally stable, ductile, resist fracture, high temperatures and corrosion; withstand fatigue; won't chip, crack or score cylinder walls.

Don't be fooled by similarity in appearance. Be sure your replacement valves and plates are marked "VOSS" and obtain the VOSS values developed by 32 years of specialized compressor valve engineering and experience.

VOSS VALVES and PLATES ASSURE

- Quiet, vibration-free operation
- 20 to 60% more valve area
- Less power consumption
- Low Pressure loss
- Normal discharge temperature
- Lower operating costs

To increase the efficiency of your compressor, send us the name, bore, stroke and speed of your machine. Our detailed proposal will be sent without obligation.

J. H. H. VOSS VALVES
REG. U.S. PAT. OFF.

J. H. H. VOSS CO.
INCORPORATED

786 East 144th Street, New York 54, N. Y.

Lighter Weight SAWING POWER Does More Work Faster . . .

Mall

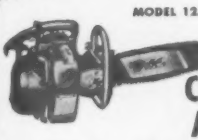
MODEL 11E18

MODEL 12A

Electric CHAIN SAW

Work faster wherever you need compact, lighter-weight sawing power. Model 11E18 Electric Chain Saw *weighs only 19 lbs.* . . . one hand guides it easily. Handles lumber and trees up to 18" thick in one cut, up to 36" in two cuts . . . hard, soft, wet or frozen wood. AC-DC 115-volt, 11 amp.; 230 volt, 5.5 amp. motor.

More power to the pound . . . less pounds to handle.



Use This Chain Saw Anywhere

Model 12A "one man" gasoline-powered Chain Saw. Full 360° indexing swivel. Cutting capacities: 18 to 42 inches.

MALL Vibrators

Save money on better finished concrete. Pneumatic, electric, or gasoline engine models.

40 Factory-Owned Service Warehouses, Coast to Coast, To Serve Our Customers and Thousands of Dealers.

Mall TOOL COMPANY

7718 S. Chicago Avenue
Chicago 19, Illinois

NO TROUBLE PERMITTED HERE

...so MARLOW PUMPS are put to work.

Efficient, trouble-free pumps MUST be used on the important oil country service of circulating hot water for an indirect emulsion heater. Temperatures of the treating tank must be kept uniform by a constant hot water flow. That's where Marlows come in.

The two Marlow Model 34EB Self-Priming Centrifugal pumps above are used by Continental Oil Company at Ville Platte, Louisiana, to handle this critical operation. It is one of four such crude oil emulsion heater systems on Continental leases in the Ville Platte area — AND MARLOW PUMPS ARE USED ON THEM ALL.

Marlow Pumps are ideal for many oil country jobs. Write for complete information.

MARLOW PUMPS
544 GREENWOOD AVENUE
RIDGEWOOD, NEW JERSEY
Engineers and Representatives Everywhere

PIPE LINES

Moving More Oil

First-quarter volumes up nearly 10,000,000 bbl.

WASHINGTON.—Oil movement through the systems of 54 pipeline companies reporting to the Interstate Commerce Commission was nearly 91,800,000 bbl. greater during the first quarter of 1952 than in the same period last year.

Transportation revenue of the 54 companies rose in the same proportion (about 11 per cent) to register an increase of $13,667,000.

The ICC's quarterly report on large pipe-line companies showed that the volume of oil originated on line and received from connections was 839,513,910 bbl. for the first quarter, against 747,725,595 bbl. for the same period last year. Transportation revenue was $130,834,913, against $117,167,798.

These increases were recorded despite the fact the 10 companies reported a decline in the volume of oil carried and 14 reported a drop in revenue.

Approximately half of all the oil carried was reported by 10 companies, as follows:

Humble carries most . . . Humble Pipe Line Co., 77,447,903 bbl. against 72,349,591 bbl. last year; Gulf Refining Co., 51,381,782 against 42,023,479 bbl.; Texas Pipe Line Co., 51,188,411 against 46,951,425 bbl.; Buckeye Pipe Line Co., 49,536,753 against 40,524,956 bbl.; Interstate Oil Pipe Line Co., 46,467,162 against 42,444,214 bbl.

Service Pipe Line Co., 45,159,571 against 40,999,095 bbl.; Sinclair Pipe Line Co., 44,190,779 against 38,555,267 bbl.; Magnolia Pipe Line Co., 43,222,095 against 38,222,943 bbl.; Shell Pipe Line Corp., 38,565,442 against 32,179,905 bbl., and Ohio Oil Co., 36,642,686 against 32,640,643 bbl.

Service's revenue highest . . . The highest transportation revenues were reported by the Service Pipe Line Co., $14,318,313 against $12,734,671; Humble Pipe Line Co., $10,708,174 against $10,450,958; Sinclair Pipe Line Co., $9,686,135 against $9,039,283; Texas Pipe Line Co., $8,344,194 against $6,873,903.

Great Lakes Pipe Line Co., $8,329,031 against $7,772,713; Magnolia Pipe Line Co., $8,102,086 against $7,686,858; Shell Pipe Line Corp., $7,953,943 against $6,095,826, and Gulf Refining Co., $7,768,124 against $7,405,329.

Interstate Lets Contract For New 8-In. Crude Line

SHREVEPORT, La.—Interstate Oil Pipe Line Co. has announced the letting of a contract to Latex Construction Co. of Georgia for the laying of about 24 miles of 8-in. crude line from its Cranfield station in Adams County, Mississippi, to Esperance Point in Concordia Parish, Louisiana.

The new line is already under way and is scheduled for completion by July 31.

Interstate also awarded a contract to Campbell Welding Works, Natchez, Miss., to lay about 3 miles of 8-in. and 17 miles of 4-in. gathering line with necessary facilities. Construction is scheduled for completion August 15.

The new lines will provide an outlet for the recently discovered Esperance Point, Deer Park, Fairview, and Lismore fields in Concordia Parish. Crude from these fields will be moved to the company's Cranfield station and thence through existing lines to Baton Rouge.

Plans for Gas Line Dropped As Firms Agree on Transport

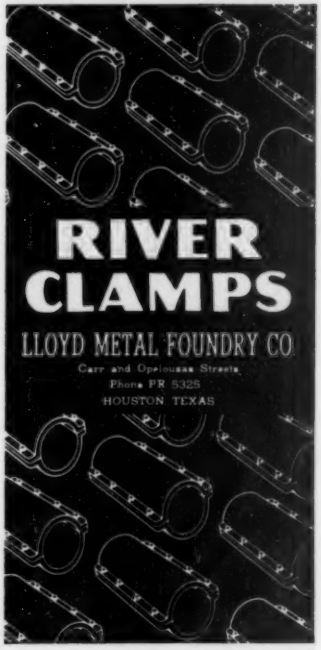
WASHINGTON.—A gas-transportation arrangement which will obviate the necessity for Southern Natural Gas Co. to build a $4,000,000 transmission line to carry gas from Carthage field in East Texas has been approved by the Federal Power Commission.

At present Southern Natural buys 115,000,000 cu. ft. of gas daily from United Gas Pipe Line Co., Shreveport. About 55,000,000 cu. ft. of this amount is produced by Southern Production Co. in Carthage field and sold to United for resale to Southern Natural.

Under the new arrangement, United will reduce its sales to Southern Natural to 60,000,000 cu. ft. daily and will carry the remaining 55,000,000 cu. ft. Southern Natural will buy this gas direct from Southern Production.

Southern Natural thus will be the sole purchaser of Southern Production gas for the life of the latter's reserves in Carthage field.

United originally proposed to increase the rates for the gas sold to Southern Natural by about $1,300,000 annually. This, together with the higher cost of gas purchased from South-



PERRAULT
GLASS
PIPE WRAP
*
★ PIPELINE FELT
★ PIPELINE KRAFT WRAP
★ ROCK SHIELD
*
"Everything for the Pipeliner"
*
PERRAULT Brothers
1130 NO. BOSTON,
TULSA, OKLA. • 5-1103
Export Office:
30 ROCKEFELLER PLAZA
NEW YORK, N. Y.
CIRCLE 6-6260

Make Your Glove Dollars Increase Production
PIONEER
Stanzoils®
PIONEER's new Stanzoil catalog shows you how to buy the right glove for each job at the lowest per hour cost. Price buying alone is false economy—no *one* glove is suitable for *all* uses. It pays to buy for utmost protection from injury *plus* hand and finger dexterity that mean faster work. New Stanzoil catalog gives you an easy method of efficient selection. *Pioneer recommendations are unbiased—we make all kinds of liquid-tight gloves,* all-neoprene, neoprene or plastic coated, 32 styles, weights, sizes, colors. Pleased workers and no work stoppages are vital these days—write today for this helpful catalog.

R-17 Extra-Duty Pioneer Stanzoil, red neoprene coated fabric, non-slip grip, curved fingers, pre-flex palm and inserted thumb design.

Industrial Glove Division
The PIONEER Rubber Co.
683 Tiffin Road, Willard, Ohio
STANZOIL
30 Years

ern Production, would have increased cost of gas to Southern Natural by about $2,000,000 annually. However, during oral argument at the proceedings, United agreed to apply the same rates in effect under its present sales contract with Southern to the reduced volumes to be sold under the new agreement.

Panhandle, Indiana Gas Hearing Set for August 11

WASHINGTON.—The Federal Power Commission has scheduled a hearing for August 11 here on proposed construction, operation, and sale of natural-gas pipe-line facilities in the Crawfordsville and Lebanon, Ind., areas.

Indiana Gas plans construction of about 19 miles of 8-in. line paralleling an existing lateral owned and operated by Panhandle between the latter's main line and Crawfordsville.

It also wants to lay about 13 miles of 6-in. line to parallel another existing lateral by Panhandle from its main line to Lebanon.

Under a plan mutually agreed upon, the two lines would be operated by Panhandle with Indiana Gas paying annual operation and maintenance charges of $1,540 for the Crawfordsville lateral and $750 for the Lebanon lateral.

Estimated cost of the proposed construction is $589,000.

Panhandle also is seeking authority to relocate its measuring and regulating stations for the two communities by building new stations at points south of the old stations. The old stations would be purchased by Indiana Gas for about $53,719.

Rockland Light May Buy 249 Miles of Gas Lines

NYACK, N. Y.—Rockland Light & Power Co. has completed plans to acquire about 249 miles of gas lines with a maximum daily capacity of 14,000,000 cu. ft. daily from Rockland Gas Co., Inc., of Spring Valley, N. Y.

The lines are located in Rockland and Orange counties, New York. They constitute all the properties of Rockland Gas which currently serves 20 communities in Rockland County, including Suffern, Hillburn, Spring Valley, Sloatsburg, Haverstraw, and West Haverstraw, and the community of Tuxedo in Orange County.

Terms of the acquizition, as proposed to the Federal Power Commission recently, involve payment of four shares of Rockland Light's common stock for each share of Rockland Gas' outstanding common stock—equivalent to $1,220,000.

See Composite and Refinery Catalogs, or Write for Folder on
FLEET-LINE
PIPE SADDLES
Nozzle sizes from ¼" to 24"

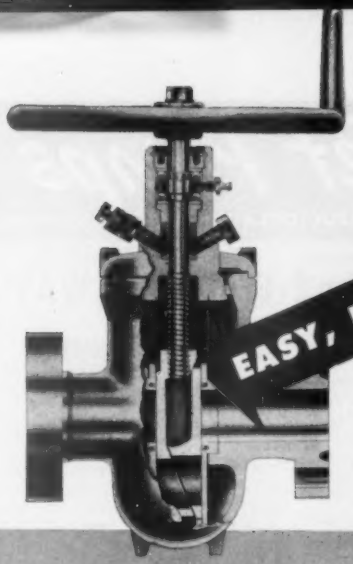
ASTM A234
STEEL FORGINGS, Inc.
P. O. BOX 276-B SHREVEPORT, LA

PIPE LINE MAPS
Map No. 25. "Jacobson's Map Showing Crude Oil and Gasoline Pipe Lines of the United States."
SHOWS: Crude oil pipe lines in blue—gasoline pipe lines in red—key refineries with capacity barrels crude oil per day—principal cities and towns.
Size 54" x 76". Scale 1" = 40 miles.
Prices: Paper, $38.00; Linen, $47.50.
•
Map No. 26. "Jacobson's Map Showing Natural Gas Pipe Lines of the United States."
SHOWS: Natural gas pipe lines with pipe sizes—major gas fields in solid red—general gas areas outlined in red—cities and towns.
Size 54" x 76". Scale 1" = 40 miles.
Prices: Paper, $38.00; Linen, $47.50.
E. C. JACOBSON
315 Mayo Bldg. Phone 2-1952
Tulsa (3), Oklahoma

M-SCOPE PIPE FINDER

MODEL AB
ONE MAN OPERATION
METAL CABINETS
HEAVY DUTY PERFORMANCE
ONLY
$149.50
FISHER RESEARCH LAB., Inc.
PALO ALTO CALIF.

STEEL
TURNBUCKLES
¾", ⅞", 1", 1¼" and 2" diameter carried in stock, in 6", 12", 18" and 24" length.
Black or Galvanized
Write or wire for prices and delivery.
NORRIS BROTHERS, INC.
Robinson, Illinois

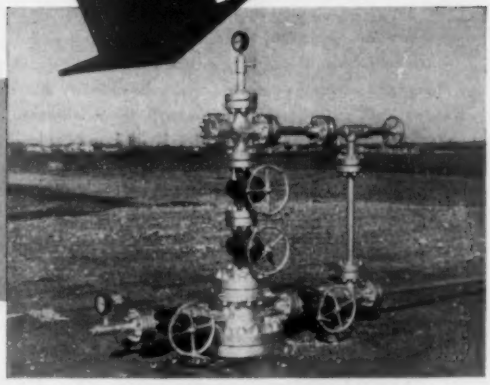


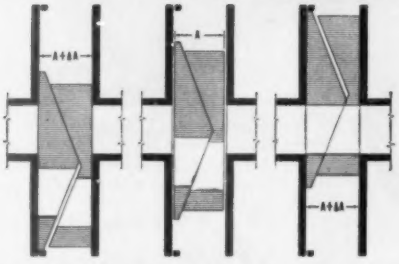
EASY, POSITIVE SHUT-OFF HERE..

MEANS SURE, SAFE CONTROL HERE!

W-K-M Parallel Expanding Gate provides a pressure-tight seal, open and closed — permits free-running operation under full-rated pressure.

Double-thrust Roller Bearings, ground stem threads, superfinished stem where it passes through the packing, contribute to the easy operation of W-K-M valves.





In closed position, the gate (left) and segment (right) seal tightly against both seats.

When opening or closing, the gate and segment are in neutral position, permitting free upward or downward movement of the gate assembly.

When open, the gate and segment again seal tightly against both seats and the bore of each lines up perfectly to provide a smooth, turbulence-free passage.

For the greatest safety, greatest operating reliability, oil men the world over specify W-K-M valves for their Christmas trees. The basic design of W-K-M valves (illustrated at left) provides a sure, tight seal in opened and closed positions and free-running operation while opening or closing.

Oil men specify W-K-M, too, because of its large and competent field organization qualified to render field emergency service and assist W-K-M valve users in any valve problem. W-K-M valves may be serviced and even completely overhauled without removing them from the Christmas tree.

Specify W-K-M for the surest and safest well control — for W-K-M valves are by far the most economical in the long run. 80% of the world's high pressure wells are controlled by W-K-M valves.

All W-K-M Valves Have

Through-Conduit Fluid Passage • Parallel Expanding Gate Assembly • Oversize Replaceable Seats Pressure Seal Bonnet • Double Row Thrust Bearings on Stem • Internal Lubrication

W-K-M COMPANY

P. O. BOX 2117 HOUSTON 1, TEXAS

727 W. SEVENTH STREET, LOS ANGELES, CALIF.

EXPORT OFFICE: 50 Rockefeller Plaza, New York, N. Y.

W-K-M *Valves*

OILFIELD • PIPE LINE • PROCESS VALVES

PENBERTHY *Jet Pumps*

(EJECTORS • EDUCTORS • EXHAUSTERS • SYPHONS)

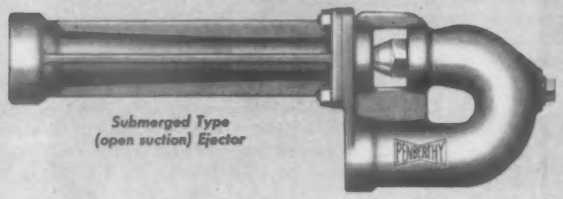
Often the MOST ECONOMICAL and EFFICIENT WAY to Transfer and Mix Fluids

The jet pump is a simple device which uses steam, water or air under pressure to pump (or mix) fluids that can include solids in suspension. Jet pumps have no moving parts, need no lubrication, have no packing glands, are practically noiseless. They are low in initial cost and installation cost . . . compact in size and trouble-free. Penberthy offers a variety of jet pumps for a wide range of ordinary and unusual applications. They can be made from materials that withstand corrosion, contamination and high temperatures. Ask for new Bulletin 512.

Standard Ejector for Steam or Air Operation

Standard Hydraulic Ejector

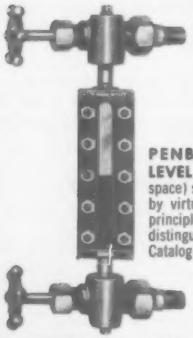
Stainless Steel Jet Pump for Handling Corrosive Chemicals



Submerged Type (open suction) Ejector

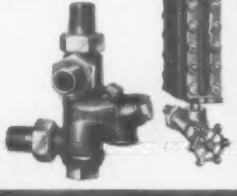
WRITE FOR *New* BULLETIN No. 512

OTHER PENBERTHY PRODUCTS



PENBERTHY TRANSPARENT LIQUID LEVEL GAGE—Used to observe color and density of liquids under high pressures and/or temperatures. Exceptionally sturdy construction—liquid chamber machined from solid block of metal. Ask for Catalog 35.

PENBERTHY REFLEX LIQUID LEVEL GAGE—Empty space (or steam space) shows white and liquid shows black by virtue of a simple, unvariable optical principle. Accurate reading as far as you can distinguish black and white. Write for Catalog 35.



PENBERTHY AUTOMATIC INJECTOR—Will supply feed water to boiler at minimum cost. Quickly, easily installed, reliable under most severe operating conditions. Ask for Bulletin 513.

4731

PENBERTHY PRODUCTS INC.

PENBERTHY INJECTOR COMPANY

DIVISION OF THE BUFFALO-ECLIPSE CORPORATION

Detroit 2, Michigan

•

Established 1886

•

Canadian Plant—Windsor, Ontario

REFINING

Texas City Refining Lets Houdriflow-Unit Contract

TEXAS CITY, Tex.—Texas City Refining, Inc., has let contract for installation of a 19,000-bbl. Houdriflow catalytic cracking unit at its refinery here to Kaiser Engineers.

The 350-ft. cracking tower is scheduled to be in operation late this year. Cost is estimated at $2,400,000.

The refinery-modernization program, long-planned by the Texas City organization, was placed in motion when majority stockholders of the company recently acquired all of the stock formerly held by Petrol Terminal Corp., according to V. A. Fogg, Texas City Refining president. Stock was purchased from the receiver for Petrol Terminal.

All operations of Texas City Refining now are under the direction of William H. Fetter, vice president and general manager. Crude-oil purchasing and refined-product sales are handled by Oil Trading Corp., of Texas City and New York.

Jefferson Petrochemical Units Get Certificate of Necessity

PORT NECHES, Tex. — Jefferson Chemical Co., Inc., has announced receipts of a certificate of necessity for construction of added facilities for synthesizing ethylene oxide and ethylene glycol at its petrochem plant here. The units will employ direct oxidation of ethylene.

Another feed gas line will be laid to the plant from the Port Arthur works of The Texas Co. An ethylene cracking unit will be built, together with the oxide and glycol units, and steam-generating, water - treating, water - cooling and storage facilities will be expanded.

New Lube Classifications To Go Into Effect Quickly

PITTSBURGH. — The new American Petroleum Institute service classification for lubricating oils, now officially adopted, will see rapid application. Replacing the former designations of "regular," "premium," and "heavy duty," the new system sets forth the types of service under which lube oils must perform—three for spark ignition engines and two for diesels.

Dr. R. Cubicciotti, of L. Sonneborn Sons, Inc., New York, last week told members of the Pennsylvania Grade Crude Oil Association at the annual meeting in Pittsburgh, that, within the next month, oil companies will begin to notify distributors, customers, and other interested parties of the change about to take place in grading lubes.

Within 6 to 8 weeks, the first cans of oil exhibiting the new A.P.I. designations will be placed in service stations. Later this year, when automobile manufacturers bring out their new models, owners' manuals will refer to the "Service MS," "Service MM," or "Service ML" recommendations instead of the now-abandoned oil-quality classifications. Diesel - engine manufacturers will also make the changes in their recommendations beginning this year.

Federal Oil Tax Collections Will Exceed $800,000,000

WASHINGTON.—Treasury collections from the four oil taxes during the fiscal year which ends June 30 will run in excess of $800,000,000, some $130,000,000 greater than the total for fiscal 1952, according to receipts for the first 10 months.

Most of the increase will be due to the half-cent per gallon added to the gasoline tax and the new tax on diesel oil, imposed under last year's revenue act.

The Internal Revenue Bureau's monthly report shows that for the first 10 months of the fiscal year $582,807,812 was collected on gasoline against $471,339,228 for the corresponding period a year ago; $78,502,933 from lubricating oils, against $80,837,543; $22,238,862 from pipe-line transportation, against $20,504,572; and $4,917,625 from the new levy on diesel oil.

Figures for the first 4 months of the calendar year show the effects of the tax changes more clearly. In that period, gasoline provided a revenue of $247,281,525, against $174,520,729 last year; lubricating oils, $36,972,070, against $28,169,925; pipe-line transportation, $10,313,543, and diesel oil, $4,917,625.

Refining Dividends Running 25 Per Cent Above Last Year

WASHINGTON. — Cash dividends paid by refining corporations are running close to 25 per cent above last year.

During the first 4 months of 1952, according to Department of Commerce

One Typical Company

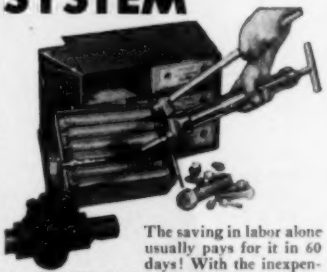
Saved over $10,000.00 the first year

. . . with the

DELTA-DESCO

Plug Valve Lubrication

SYSTEM



The saving in labor alone usually pays for it in 60 days! With the inexpensive DELTA-DESCO SYSTEM an operator can lubricate 10 to 15 valves in the time usually required to lubricate one—and do the job better!

The DELTA-DESCO SYSTEM combines Delta Gun Fittings (or Automatic Lubricator), High Pressure Gun, Desco Specialized Lubricants, and Engineering Service. You stock only half as many DESCO Lubricants—3 Standard and 1 Special—that's all you need.

Let us show you how to save ⅓ on *your* plug valve maintenance.

• • • • • • • • • • • • •

ANOTHER VALVE SAVER —

DELTA AUTOMATIC

Plug Valve LUBRICATOR

A simple, fool-proof device, automatically lubricates valve each time it is opened and closed. Ideal for frequently opened valves on loading platforms, manifolds, LPG lines.

• • • • • • • • • • • • •

The Only Complete Plug Valve Lubrication Company

3.

DELTA-DESCO SYSTEM

DELTA

ENGINEERING SALES CO.

806 Louisiana Ave. • Phone 5-2416

SHREVEPORT, LOUISIANA, U.S.A.

Sales Offices In All Principal Cities

WE'LL BREAK YOUR FRACTIONATING "BOTTLENECKS" . . .

AT LEAST 30% ADDITIONAL THRUPUT IS GUARANTEED WITH KOCH "BENTURI"—TYPE KASKADE TRAYS

IN the past few months, Koch Kaskade trays have broken 24 "bottlenecks" in all ranges of bubble tray service—7" to 30" tray space—from 5 mm. absolute to 820 psig. operating pressure—BECAUSE PROGRESSIVE OPERATORS REPLACED CONVENTIONAL BUBBLE TRAYS WITH KOCH KASKADE TRAYS.

Your "bottlenecks" can be broken, too! Write today, advising us of your existing tower size, the vapor and liquid capacities you desire, and we'll tell you what you can obtain with Koch Kaskade trays.

KOCH ENGINEERING COMPANY, INC.

DESIGNERS · MANUFACTURERS · BUILDERS
321 WEST DOUGLAS — WICHITA 2, KANSAS

REPRESENTATIVES

Eastern and Export
30 Rockefeller Plaza
New York City

Pittsburgh, Pa., Repr.
D. D. Foster Co.
714 Frick Bldg.

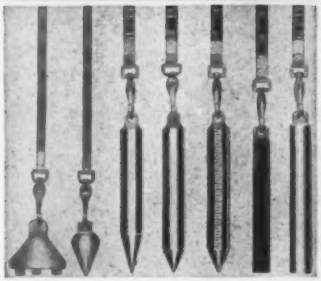
Tulsa, Okla., Repr.
Myers-Bogwell Co.
Wright Bldg.

British Associates
Messrs A. F. Craig & Co., Ltd.
Paisley, Scotland

statistics, dividend payments amounted to $247,800,000, compared with $200,100,000 in the same 1951 period. April dividends were low—$7,600,000 against $8,500,000 last year—but the month ordinarily is not one of heavy payments by corporations in any industry.

The 23.9 per cent increase in refining dividends was far above the 5 per cent increase reported for corporations as a whole, and in dollar distribution no other manufacturing industry came within $95,000,000 of the amount paid out by the oil companies during the 4-month period.

Starrett "Oil Gager"
PLUMB BOBS
For Starrett Steel Tapes



All types—innage, outage, round, square, cone, non-sparking, etc.—for gaging light oils, heavy oils, water or gasoline in field or ship tanks. For complete information,

WRITE FOR BULLETIN NO. 112 OG

THE L. S. STARRETT COMPANY • ATHOL, MASS., U.S.A.

Starrett

SINCE 1880
WORLD'S GREATEST TOOLMAKERS

BUY THROUGH YOUR DISTRIBUTOR MECHANICS' HAND MEASURING TOOLS AND PRECISION INSTRUMENTS • DIAL INDICATORS • STEEL TAPES • PRECISION GROUND FLAT STOCK • HACKSAWS, BAND SAWS and BAND KNIVES

VICTOR ALLOY STUDS

VICTOR PRODUCTS CORP.
2635 W. BELMONT AVE. • CHICAGO 18, ILL.

Refining Briefs

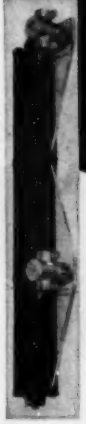
A new lubricating-oil additive which will permit efficient use of fuels with high sulfur content under "severest operating conditions" has been announced by the petroleum - chemicals department of American Cyanamid Co. Termed "Aerolube 92," the new product combines antioxidant and bearing corrosion - inhibition properties with "highly effective alkaline detergency" says H. E. Nehms, of American Cyanamid. It was designed specifically for use in the Series 2 oils, which will fall generally in the newly adopted service designation MS and DS.

n-Propyl acetate, a powerful active solvent used extensively in laquer formulations, is now available in tank-car quantities from the chemical division, Celanese Corp. of America. This product is the first is a series of esters to be manufactured by Celanese at Bishop, Tex.

Beginning of New Plant

M. Robert Lipkin 10 years ago was doing basic research on a new method of separating chemicals and conceived the idea that it might be used on a commercial scale. Last week, Lipkin, who now is section chief on special problems in Sun Oil Co.'s research laboratory, saw culmination of his work and that of many others when he turned the first shovelful of dirt on the spot at Sun's Marcus Hook, Pa., refinery where a new petrochemicals plant employing the company's newly developed Arosorb process will be erected. The plant is one of two involved in a $12,000,000 petrochemicals project. Annual output with that of a Houdriforming unit, will be 15,000,000 gal. of benzene, 22,000,000 gal. of toluene, and 19,000,000 gal. of xylenes. Looking on at the ground breaking are Sun's Stewart S. Kurtz, Jr., manager of chemical research, and Dr. Jon R. Bates, director in charge of research and development (right).

You Get Even, No Glare
LOW COST LIGHTING
for Gages, Rotameters, etc.
with
JERGUSON
Explosion-Proof
GAGE
ILLUMINATORS



Single and Double Section Jerguson Illuminators on a 3-Section Gage.

UNDERWRITERS' LABORATORIES APPROVED

YOU get even, no glare, Low Cost Lighting with Jerguson Gage Illuminators . . . the improved illuminators that are unexcelled for gages, rotameters, etc. They give you ideal illumination with safety . . . and make possible faster, easier, accurate reading.

Jerguson Illuminators use the principle of solid wedge lighting to give you *clear, even lighting, without bright spots.* Light flows through the plastic wedge and is reflected evenly. A single small bulb gives you better illumination at a cost so low that savings quickly pay for the illuminator.

Jerguson Illuminators are approved by Underwriters' Laboratories and are built in accordance with their Standard for Electric Lighting Fixtures for use in hazardous locations for Class 1, Group D Services. Made in a variety of sizes; also available in a non-explosion proof model.

Investigate Today. Write for Data Unit on Jerguson Illuminators

JERGUSON
Gages and Valves for the Observation of Liquids and Levels
JERGUSON GAGE & VALVE COMPANY
100 Fellsway, Somerville 45, Mass.
Representatives in Major Cities
Phone Listed Under JERGUSON
Jerguson Trees Gage & Valve Co. Ltd., London, Eng.

When it comes to

OIL FINANCING

We're shirt sleeve Bankers

Yes, here at National Bank of Tulsa's oil loan department, we get right down to business when you bring us your financial requirements. Many years of dealing with oil men have taught us the "ins and outs" of the oil business and we are able and ready to give you the fastest, most dependable service possible. National Bank of Tulsa's adequate resources and information and "know-how" make the going easier, too. Come in now for a friendly discussion.

The Oil Bank of America

NATIONAL BANK OF TULSA

OFFERING COMPLETE BANKING AND TRUST SERVICES

Member Federal Deposit Insurance Corporation

NATURAL GAS

FPC Eyes Rates

Proposed schedule hikes being scrutinized closely

WASHINGTON.—The Federal Power Commission is making a microscopic examination of applications filed by natural-gas companies for increases in rates aggregating well over $100,000,000 a year.

In one action late last month, the commission rejected one and suspended four proposed wholesale rate schedules, which totaled more than $50,000,000 a year and were scheduled to go into effect June 1.

A $3,300,000 increase in rates of the Mississippi River Fuel Corp. was turned down on the ground that about one-third of it was based upon an assumed increase in the cost of gas purchased from United Gas Pipe Line Co., which, however, has not filed for an increase as yet.

The suspended schedules were those of Texas Eastern Transmission Corp., amounting to approximately $41,800,000; Ohio Fuel Gas Co., $2,200,000; Manufacturers Light & Heat Co., $2,200,000; and Home Gas Co., $1,242,000. They will be the subject of hearings and final decision by November 1, the 5-month limit in which FPC must act on suspensions.

Not supported . . . In holding up the four applications, the commission said the proposed increases have not been supported as required by the Natural Gas Act and may be unjust, unreasonable, unduly discriminatory or preferential, or otherwise unlawful, and may place an undue burden upon ultimate consumers of natural gas.

The cases were the first big matters on which new Commissioner Dale E. Doty voted. He held all four should have been rejected rather than suspended.

An application for a $13,600,000 increase in rates of Transcontinental Gas Pipe Line Corp., Houston, which was suspended last November 29, now has been dismissed by the commission.

Hearings to Open on Exports And Imports of Canadian Gas

WASHINGTON. — A consolidated hearing before the Federal Power Commission will get under way here June 16 on proposals of eight companies to export or import gas to or from Canada.

Five of the firms have applications before the commission to serve market areas in the Pacific Northwest.

The June 16 hearing will not be concerned with market requirements—only with gas supply, reserves supporting the supply, issuance of governmental authorization outside the United States upon which the supply of gas is in any way contingent, and with any other issues excluding market requirements.

Evidence will be presented by the companies in the sequence listed above.

After presentation of this evidence, FPC said late in May, the commission counsel and other parties will conduct such cross examination as they are prepared to undertake. The hearing will then be recessed pending further commission order on presentation of evidence on market requirements, cross examination, etc.

Companies whose applications have been consolidated for the hearing are: Northwest Natural Gas Co., New York; Pacific Northwest Pipeline Corp., Houston; Westcoast Transmission Co., Wilmington, Del.; Glacier Gas Co., Butte, Mont.; Tennessee Gas Transmission Co., Houston; Niagara Gas Transmission, Ltd., Toronto, Ont.; Northern Natural Gas Co., Omaha, Neb.; and Trans-Northwest Gas, Inc., Spokane, Wash.

According to a recent statement by Senator Cain of Washington, the latter hearing may be held in the Pacific Northwest. The senator made public a letter he had received from Commission Chairman T. C. Buchanan, who said he felt that market data at least should ge gathered in the Northwest.

Natural Gasoline

New Capacity

Elk City plant operators finish $3,000,000 project

ELK CITY, Okla. — Enlargement of the Elk City gas-processing and cycling plant 3½ miles south of this city was completed last week by Shell Oil Co., operator.

The $3,000,000 expansion involved the addition of five 1,760-hp. gas compressors, a low-pressure gas-gathering system, additional gas injection lines, and new processing facilities including a 50,000-M.c.f. per day absorber tower. Addition of 8,800-hp. of compressor capacity supplements former capacity of 9,450-hp. furnished by seven 1,350-hp. units.

Capacity of the new processing equipment will be 150,000 M.c.f. of gas daily, with an injection capacity of 135,000 M.c.f. of gas per day. The difference between these two figures is approximately the amount of gas used for plant fuel plus shrinkage in gas volume due to liquid-products extraction.

The original plant was designed to process 100,000 M.c.f. of gas per day, to stabilize 20,000 bbl. of crude oil per day, and to inject 75,000 M.c.f. of gas per day into the producing Hoxbar conglomerate reservoir.

Design capacity was for 150,000 gal. of natural gasoline and butane daily, and 75,000 gal. of propane per day.

The enlargement will increase capacity to 225,000 gal. of natural gasoline and butane and 100,000 gal. of propane.

Other owners of the plant are Continental Oil Co., J. M. Huber Corp., Superior Oil Co. of California, Tide Water Associated Oil Co., Union Producing Co., United Carbon Co., Inc., Wilcox Oil Co., and Willis G. Meyer.

Humble Expanding L.P.G. Facilities in Pickton Field

HOUSTON.—Humble Oil & Refining Co. has launched a new and larger pressure-maintenance program in Pickton field of Hopkins County, Texas, which involves installation of new and revamped facilities to increase recovery of liquid products.

Capacity production of L.P.G. at the plant will be about 2,500 bbl. daily when the expansion is completed.

The project also involves construction of a new compressor station and other facilities. The installation will process an additional 30.6 million cubic feet of gas daily and will inject 28 million cubic feet back into the reservoir.

Work began on the project in May and will be completed before the end of the year. Stearns-Roger Manufacturing Co., Denver, was awarded contract.

Since the original Pickton field plant was built, the productive area of the field has approximately doubled.

Humble expects to increase recovery from the field as a whole by about 85 per cent. An invitation has been extended by Humble, as operator and owner of the existing plant, to all operators in the unitized field to purchase interest in the facilities in proportion to their interest in the field.

Production at present has been curtailed to minimize flaring of gas. When the new program is completed, normal oil production will be resumed and no gas will be flared.

Cut Drilling Costs!

Drill with

DRISCOSE*

Compare the cost per foot . . . and you'll see that Driscose saves you money. Time after time the experience of drillers has demonstrated that Driscose reduces overall costs!

The high suspending characteristics of Driscose help you stabilize your drilling mud. You cut down on your light solids content while keeping better control over viscosity and gel.

With Driscose you don't need lots of clay and gel to suspend weighting materials. Muds weighing from 14 to 17 pounds per gallon with very low viscosities and zero-zero gels have been maintained without barite settling problems where Driscose was used.

With Driscose there is less watering back to get rid of undesirable light solids, and less weighting material is needed to maintain mud weight. And you get the advantages of a thin, tough filter cake . . . low water loss.

Order Driscose from your regular drilling mud dealer and cut *your* costs!

*DRISCOSE *is a trademark for Sodium Carboxymethylcellulose*

DRILLING SPECIALTIES COMPANY

BARTLESVILLE, OKLAHOMA

North Louisiana's Monroe Gas Area

THE official completion of Feazel Interests and Monla Gas Co., Inc., 1 Breece Lumber Co. (arrowed on map) has led to some interesting speculation on what the deeper formations at the southern end of the immense Monroe gas field might eventually yield.

The 1 Breece Lumber Co., 3-18n-5e, Ouachita County, northeastern Louisiana, was completed for 25 M.M.c.f. of gas plus 28 bbl. of 65°-gravity condensate per day from perforations at 7,343-69 ft. opposite the Bodcaw member of the Jurassic-Cotton Valley series. This is the first Cotton Valley production in the area. The nearest Cotton Valley production is at Beekman (see map), a small 1951 oil discovery. The nearest substantial Cotton Valley production is at Ruston gas-condensate field some 40 miles to the west (off map).

Monroe field, which sprawls over more than 400 sq. miles, produces from two separate reservoir zones. One is known as the "gas rock" and the other as the "second sand." The gas rock is of Upper Cretaceous-Navarro age in the western part of the field and in the central and eastern parts of the field, where the Navarro is absent, it passes laterally into the eroded and leached part of the older Upper Cretaceous-Monroe gas rock (Chalk Rock series) formation. It is found at depths ranging from 2,050 to 2,300 ft. The second producing zone occurs 100 to 250 ft. below the gas rock. It is in part Upper Cretaceous-Woodbine and in part Lower Cretaceous-Glen Rose. The field was discovered in 1916. It has had some 2,000 gas wells drilled in it, more than 300 of which were drilled in the past 3 years.

A few small gas and gas-condensate fields have been found in Lower Cretaceous formations in the general Monroe area in recent years, but deep drilling has been rather limited. Prior to the discovery at the 1 Breece Lumber Co. the few wells that had cut the Cotton Valley rocks failed to find them productive of either oil or gas.

Though the "stringer" nature of Cotton Valley sands have tempered excitement over the recently completed discovery there are certain thoughts that might make this deeper pool wildcat near Swartz very exciting for the future of the area in deeper rocks.

In the American Association of Petroleum Geologists' symposium "Geology of Natural Gas," published in 1935, is a paper on Monroe gas field by Preston Fergus, now of Union Producing Co., Tyler, Tex.

Fergus wrote: "The gasoline content of the gas is negligible excepting on the southeast flank of the field. Here edge wells show a maximum of gasoline content of 600 gal. to 1 million cubic feet of gas. From this locality the gasoline content diminishes rapidly in a northwesterly direction.

"Various theories relating to the source of the gas have been suggested. The one which seems most tenable is that the gas has migrated vertically along faulted zones during different periods of crustal disturbances. It has previously been stated that there are no proved faults within the field. However, several lines of evidence suggest faulting. This is especially true of the Swartz area at the southeastern edge of the field. It is thought that the gas first entered the reservoir in this locality and gradually migrated northward and westward into other parts of the field. In this connection it is postulated that the lighter hydrocarbons were first to enter the reservoir and that at some later period the heavier gas, containing gasoline, entered."

That was written in 1933. There is still no evidence of major faulting in the area, but now in that Swartz area a sizable gas-distillate well has been completed. Could there be a large liqiud reservoir at depth somewhere in the area? There well could be, if not in the Cotton Valley sands in yet deeper rocks in the area.

Deeper horizons are the principal hope in all older and middle-aged producing areas—northern Louisiana is no exception.

Philip C. Ingalls.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

COLORADO . . . Superior Oil Co. has run casing to test shows in Pennsylvanian at the important Eads area wildcat along the Las Animas arch in Kiowa County. The well was drilled to 5,588 ft., total depth, with pre-Cambrian topped at 5,550 ft.

NEBRASKA . . . British-American Oil Producing Co. has recovered oil at 1 Jacobsen, east of the town of Sidney. Magnolia Petroleum Co. has an apparent new-pay discovery in Goodwin field, Kimball County.

WEST TEXAS . . . Sinclair Oil & Gas Co. 1-126 University, Section 13, Block 4, University Land, 3 miles southwest of Flat Rock, Upton County, flowed 451 bbl. of 41.5°-gravity oil and 99 bbl. of basic sediment per day through perforations from 9,575-85 ft. in Wolfcamp after acid treatment.

NORTH DAKOTA . . . Amerada Petroleum Corp. 1 Skarr, Tioga area wildcat in Williams County, flowed oil on drill-stem test of Madison at 8,190-8,220 ft. (see news section).

Southwest Texas

New Oil Pay Opened In Nueces County

CORPUS CHRISTI — Atlantic Refining Company has opened a new oil pay at the 1 Taylor-Connally, 12 miles southwest of Corpus Christi in Nueces County. Test on perforations at 7,036-50 ft. flowed 138 bbl. of oil per day on a ¼-choke with tubing pressure registered at 1,050 psi. Gas-oil ratio is 1,650:1. Hole is bottomed at 10,279 ft. with 5½-in. production string cemented to 9,866 ft., and plugged back total depth is 7,071 ft. Production is from the upper Frio. Location is on the Ramon de Ynojosa Survey, A-411.

Spartan Drilling Company et al has opened a new oil field 3 miles northeast of Odem in San Patricio County. The new discovery potentialed 315 bbl. of 34.8°-gravity oil per day on a 10/64-in. choke with tubing pressure of 1,450 psi. Gas-ratio is 567:1. Completion was finaled through perforations at 8,078-82 ft. with hole bottomed at 8,137 ft. and 5½-in. production string cemented to 8,134 ft. with 2-in. tubing run to 8,065 ft. Discovery is on the J. W. Bullard Subdivision.

A. O. Phillips announced potentials on the 1 L. E. Sanders located in the William M. Carpar Survey, A-47, as a dual oil-gas well. Perforations in the Frio B-4 sand at 7,176-80 ft. flowed 160.84 bbl. of oil and 48,000 cu. ft. of gas on a 24-hour test. Hole was drilled to a depth of 8,154 ft. with 5½-in. casing cemented to 7,500 ft.

David L. Gordon perforated at 4,501-06 ft. on the 1 Dario Salinas, wildcat, after running 5½-in. production string to 4,564 ft. Hole was bottomed at 6,822 ft. with electric log run to total depth. Location is on La Huerta Grant, A-227, Duval County.

Kirkwood and Morgan have issued plugging orders for the J. H. Nicholson, a Frio County wildcat. The test was drilled to a depth of 5,988 ft. and no commercial shows were encountered. Location is on J. Poitevent Survey, A-558.

Eighteen miles southwest of Corpus Christi, Republic Natural Gas Co. and Chicago Corp. has recovered oil on drill-stem test at the 1-111 Chapman Ranch, wildcat 3 miles southwest of Chapman field production in Nueces County. Test on perforations at 4,295-98 ft. with ¼-in. chokes under 155 psi. working pressure flowed at the rate of 102 bbl. of oil plus 68 bbl. of salt water. Bottom hole pressure was recorded from 1,750 to 1,975 psi. Hole is bottomed at 7,620 ft. with 5½-in. production string cemented to 4,350 ft. New discovery was producing from the Catahoula and located on the Laureles Farm Tracts.

B.B.C. Oil Royalty Co., Inc. is testing the 1 Ben Rauch, wildcat in Caldwell County, after running 5½-in. production string to total depth. Sidewall cores taken in the Buda and Edwards indicated possible oil production. Hole is bottomed at 1,639 ft. Location is on Cornelius Crenshaw Survey.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCATS

Atascosa County: Oil discovery—M. & S. Rosner 1 Nellie Dinsmoor, John Bryan Sur. A-238, TD 2,085 ft., Carrizo 2,075 ft., perf. 2,075-77 ft., IPP 83.66 bbl. per day, 18.5° gravity, ¼-in. choke.

San Patricio County: Spartan Drilling Co. et al 1 J. W. Bullard, J. W. Bullard Subd., TD 8,137, IPF 315 bbl. oil per day, 34.8° gravity, 10/64-in. choke.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Aransas County: Selby-Walker Corp. and Joseph T. Dawson 1 Travis Bailey, Joseph Fessenden Sur. A-65, dry, TD 7,500 ft.

Duval County: J. P. Bristow & Co. 2 Leila Peters, GB&CNG 31, A-725, dry, TD 3,250 ft.

Hidalgo County: Sun Oil Co. 1 A. Alamia et al, San Salvador del Tule Grant, dry, TD 8,999 ft.

Jim Hogg County: Sid Katz & R. H. Venable 2 Mary E. Premont, E. R. Jenson Sur. dry, TD 4,069 ft.

Sun Oil Co. 2 Alice J. Eshleman et al, Pal Blanco Antonio Pena Sur. A-246, dry, TD 6,003 ft.

Tri-Mark Oil Co. 1 Mrs. Katherine Parr Hamilton, Herman Pressler Sur. 120, dry, TD 3,092 ft.

Kenedy County: La Gloria Corp. et al 1 Laguna Madre St. Tr. 235, dry, TD 10,105 ft.

Medina County: R. Winburn 1 Porter, Joseph Campbell Sur. 24, dry, TD 1,004 ft.

Nueces County: Fitzpatrick Drilling Co. 1 Willie Bezdeck, Partition of Wright Lands School, dry, TD 6,881 ft.

Selby-Walker Corp. & Joseph T. Dawson 1 Ennis S. Joslin, Flour Bluff & Encinal Farm and Garden tracts, dry, TD 7,969 ft.

Webb County: The Chicago Corp. B-1 Bruni Est. Sur., A-943, dry, TD 2,936 ft.

Sid Katz et al 1 S. Benavides Est., BS&F Sec. 703, dry, TD 3,174 ft.

Magnolia Petroleum Co. 1-A Carl Newton Est., F. R. Rooney Sur., dry, TD 2,336 ft.

E. J. Pear & Ralph Rowden 1 Daniel Adami, RP&CS Fly Sur., 1, dry, TD 1,915 ft.

The **INFERNO Double Cylinder FIRING CONTROL**

TURNS the FIRE on AHEAD of the DRAFT and CUTS THE DRAFT OFF AHEAD of the FIRE

FIRES ONE or a COMPLETE BATTERY OF BOILERS

FIRES with EITHER OIL or GAS

CONTROLS BLOWERS

SAVES DRILLING TIME (By Holding Up Boiler Pressure at All Times)

SAVES LABOR (By Automatically Doing a Large Part of The Fireman's Work, Releasing Him for Other Duties)

SAVES FUEL (By Eliminating Wasteful Popping of the Boilers. We Have Reports of Savings from 10% to 30% on Fuel Bills)

Write for Bulletin 8B

SOLD THROUGH YOUR SUPPLY STORE OR DIRECT

THE **INFERNO** CO.

P. O. Box 1138A • 115 Ricou St. • SHREVEPORT, LA.

Willacy County: G. C. Schoonmaker 1 Bertha Beachum, Narcisso Tr. 4, Sec. 7, Lot 9, dry, TD 9,848 ft.

Williamson County: Carl Hall et al 1 B. C. Stalmaok, S. W. Noble Sur. A-807, and W. J. Cowan Sur. A-146, dry, TD 930 ft.

S. W. Messer 1 Mrs. C. W. Pfluger, Joseph Jordan Sur. A-520, dry, TD 1,200 ft.

Canadian Fields

Manitoba Field Adds Sizable Extension

CALGARY.—Four discoveries were made in western Canada during the past week and a sizable extension was chalked up in Manitoba's first oil field, at Virden. The most recent discovery was an oil strike in the Antelope Lake area of southwest Saskatchewan, while the other discoveries were made in Alberta, including two oil finds and a wet gas strike.

The Saskatchewan discovery was made by Socony-Vacuum Exploration Co. on farmout lands from Western Prairie Exploration Co. and Southern Production Company, Inc., at a site about 62 miles east of the Alberta border and 35 miles west of Swift Current. This well, Socony-Western Prairie 1 Midway, on LSD 14, 15-19w3, found 18°-gravity crude oil in the Jurassic formation during test from 3,445-65 ft. Gas flow rate was 80,000 cu. ft. daily and recovery was 1,480 ft. of oil in 90 minutes.

The Antelope Lake wildcat records the second oil discovery for Socony in its 1952 Saskatchewan program. The first was made at Fosterton, about 15 miles to the northeast and the company is carrying out an extensive development and step-out drilling program in that region.

Central Leduc Oils and Del Rio Producers discovered oil in the St. Albert area of central Alberta this week at its Central Del Rio St. Albert driller, on LSD 5, 7-54-25w4, about 6 miles northwest of the Edmonton city limits. During drill-stem test in the basal Cretaceous of interval 3,801-09 ft., a pipe recovery consisting of 1,140 ft. of 36°-gravity oil was recorded. This well is about 2 miles south of Imperial 1 Sturgeon oil discovery, and some 2 miles northwest of St. Albert town.

At Camrose, about ¾ mile south of the central Alberta town, a team comprised of Mitmore, Sturgeon, Modoc, Ban and Dominion Minerals found Viking oil and indicated around 18-20 ft. of pay zone. Site of the well, Mitmor-Sturgeon-Modoc-Banner-Dominion Minerals, is LSD 14, 27-46-20w4, about 2¼ miles southwest of previous Camrose area oil production. Initial drill-stem test in the Viking sand discovery horizon of interval 3,236-46 ft. yielded 1,690 ft. of oil, 360 ft. of oil-cut mud and 70 ft. of fresh water, while a later test of interval 3,248-53 ft. gave up 1,260 ft. of clean oil, no water. Production casing has been set and the well will be completed at present depth, about 18-20 ft. of Viking pay zone has been indicated.

In the Nevis area, about 12 miles west of Stettler Devonian oil field and 3½ miles northeast of a Canadian Gulf oil, gas and condensate discovery well, the Calgary team of Federated Petroleums and United Oils struck a large wet gas flow from the D2 zone of Devonian. At weekend, the well had opened up some 145 ft. of D2 zone, and had received wet gas flow rates estimated up to as high as 30,000,000 cu. ft. daily. Naphtha recoveries were also found when pipe was

Republic
NATIONAL BANK
of Dallas

. . . a Leader in Petroleum Financing

The facilities of our fully integrated Petroleum Department are available to correspondents in connection with Oil and Natural Gas Loans.

My Bank

CAPITAL AND SURPLUS $42,500,000 • LARGEST IN THE SOUTH

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

You'll find these 5 most-wanted features ONLY IN SHAFFER HYDRAULIC GATES!

From years of building cellar control gates for the oil industry, we have found that five top features wanted by engineers, executives and field men are:

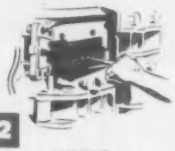
(1) Maximum Compactness
(2) Simple Ram Changes
(3) Positive Operation
(4) Mud-Free Internal Construction
(5) Sealed, "Clutter-Free" External Design

You get these features in the Shaffer Hydraulic Cellar Control Gate —*and only Shaffer has them all!*

1

MAXIMUM COMPACTNESS!

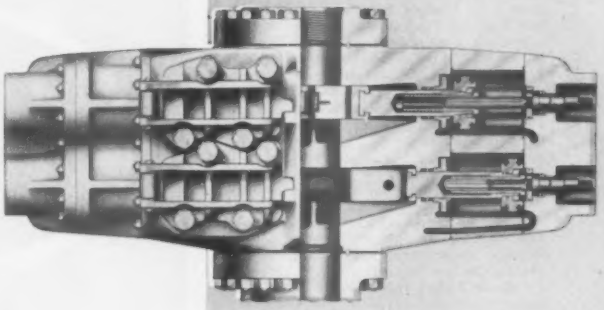
Even in sizes as large as 13⅝" (12" Series 900), the Shaffer Hydraulic *Double* Cellar Control Gate provides *two* ram compartments in one body only 30" high. Also available—a Shaffer Hydraulic *Single* Cellar Control Gate only 18½" high in the same size!

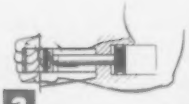


2

SIMPLE RAM CHANGES!

In no gate is ram changing quicker or simpler than in Shaffer Hydraulic Gates. Merely unbolt and open a side door, slide the old assembly out and the new one in, then close and bolt the door. It's that easy. *And complete ram changes can be made whether the pipe is in or out of the hole!*





3

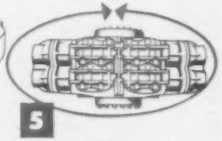
POSITIVE DIRECT OPERATION!

In Shaffer Hydraulic Gates the operating cylinders are *directly behind* the rams for maximum simplicity and greatest safety. There are no complicated yokes, no multiple-element connections between hydraulic cylinders and rams. Operation is simple, direct, *positive!*

4

MUD-FREE INTERNAL CONSTRUCTION!

Free ram travel is assured in Shaffer Gates because the rams travel on high narrow guide ribs far above the steeply-sloped compartment bottoms. Mud and sand quickly drain back into the well—no detrimental accumulations interfere with closing operations!



5

COMPLETELY ENCLOSED DESIGN!

All moving parts—including piston rod ram shafts—are completely enclosed within the body of Shaffer Hydraulic Gates. Even the locking shaft is non-rising—completely protected. No exposed operating parts to become wedged, bent or corroded.

Backed by over a quarter century of pressure control "know-how", Shaffer Hydraulic Cellar Control Gates are the outstanding choice for modern drilling protection. And remember—Shaffer not only provides *Hydraulic* Gates (both *double* and *single*) but also provides a complete selection of *Mechanical* Cellar Control Gates (both *double* and *single*) for installations where mechanical operation is preferred.

29 years OF OIL TOOL LEADERSHIP

Get full details from your nearest Shaffer representative—or write direct!

See pages 4525 to 4600 of your 1951 Composite Catalog.

Write for your free copy of the Shaffer 1951 Catalog.

SHAFFER

HIGH PRESSURE DRILLING AND CONTROL EQUIPMENT • FISHING TOOLS THAT EXCEL

SHAFFER TOOL WORKS, Brea, California • California Service Shops: Santa Fe Springs and Taft
HOUSTON, TEXAS, 6006 Navigation Blvd. • ODESSA, TEXAS, 1925 West Second Street
OKLAHOMA CITY, OKLAHOMA, Acme Oil Tool Company, 1001 S. E. 29th Street
CASPER, WYOMING, Shaffer Tool Works, Post Office Box 1788
EXPORT SALES OFFICE: Shaffer Tool Works, 500 Fifth Avenue, New York, N. Y., U.S.A.

pulled, and recorded pressures were very high. The well is, Federated United 19-2 Nevis, on LSD 14, 2-39-22w4, first drill-stem test was run in the D2 from interval 5,308-20 ft., an immediate flow of gas reaching a maximum daily rate of 15,000,000 to 20,000,000 cu. ft. daily. A slight trace of naphtha was also reported. While latest test still in the prolific gas producing D2 horizon, of interval 5,405-25 ft., flowed gas at 8,500,000 cu. ft. daily and showed a pipe recovery of 2 ft. naphtha. Crew is now reaming rathole, preparatory to coring and testing ahead.

The Manitoba oil extension was made by Canadian Superior Oil of California at its 14-4 Cruickshank well, on LSD 14, 4-10-28w1, some 2¼ miles west of California Standard oil wells. This Mississippian producer rated an indicated potential of 52 bbl. of 34°-gravity oil during first three days of pumping operations.

CANADIAN WILDCAT FAILURES

Phillips 1 Bawlf, LSD 9, 30-45-17w4, TD 4,788 ft.

Hudson's Bay Royalite Union 2 Chinook, LSD 13, 29-85-23w5, TD 2,646 ft.

Western 1 Byemoor, LSD 8, 34-34-17w4, TD 6,065 ft.

Western 11-4 Scapa, LSD 4, 11-33-14w4, TD 4,768 ft.

Ridgeway Wagner 7-17 Cavendish, LSD 7, 17-21-3w4, TD 3,568 ft.

Merrill Mitmor Sturgeon 1 Campbell, LSD 1, 25-54-26w4, TD 4,545 ft.

South Louisiana

New Pool Opened In Terrebonne Parish

NEW ORLEANS.—A new pool has been opened in the Baptiste area, Terrebonne Parish with the completion of Leslie Bowling 1 La Terra, 38-19s-19e. Initial potential test of 62 bbl. of 56.0°-gravity distillate plus 2,500 M.c.f. of gas daily on a 11/64-in. choke through perforations 10,692-710 ft. Tubing pressure registered 3,600 psi. with casing pressure of 3,400 psi. The gas-distillate discovery was drilled to a total depth of 13,383 ft. with 5-in. casing set at that point.

A drill-stem test through perforations from 7,959-61 ft. with packer set at 7,915 ft. has been reported on the Humble Oil & Refining Co. 1 State Lease 1927-Blind Bay in Plaquemines Parish for 19.6 bbl. of condensate plus 1,875 M.c.f. of gas daily through 1-in. by 3/16-in. chokes. Working pressure of 3,100 psi. was registered with 54°-gravity and gas-oil ratio 14,464 to 1. The well drilled to 8,000 ft. and has 7-in. casing cemented at that point.

The Progress Petroleum Co. has potentialed the Juban 4-7s-3e, Livingston Parish for 130 bbl. of 50°-gravity oil per day through a 9/64-in. choke. The new oil discovery, drilled to a total depth of 9,013, was completed through perforations from 8,591-97 ft. with flowing pressure of 1,400 psi. and gas-oil ratio 2,000 to 1. Casing was cemented on bottom.

Humble Oil & Refining Co. is assured of a new discovery at the 1 Jennie Kyle McKerall et al in the East Lake Verette area, Assumption Parish. The new discovery, located in Section 27-13s-13e, has been drilled to a total depth of 12,208 ft. with 7-in. casing cemented at 11,525 ft. and 2½-in. tubing swung at 11,265. On a 2-hour test, through perforations from 12,106-111 ft., the well flowed 1,726 M.c.f. of gas daily on a

BANKS . . . are people. Probably more than in any other American enterprise, the person you deal with, is as important as any other factor. This series of ads is designed to help you know more about your "FIRST" friends in Tulsa.

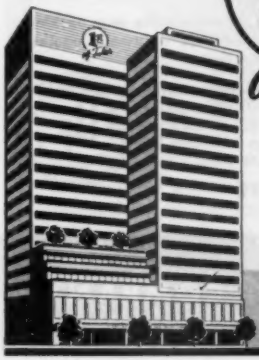
Joe Byrd Can Tell You What's Cookin'!

Joe, a former Georgia cracker and railroad telegrapher, decided he wanted to eat a little better, so he took up banking. In Tulsa banks since 1909, he thought FIRST in 1920, and rose rapidly through the ranks. He's now a Senior VP and is known nationally by bankers, especially those who also like to eat well.

Joe's interest in hunting and fishing, led to his main hobby as an outdoor chef. His recipes are nationally known, and it's indicative of Joe that his best steaks aren't necessarily saved to serve only to Bank examiners.

He has long been active in ABA, and Oklahoma Bank activities. Another hobby is, naturally, Boy Scout work. Our only complaint is that he's much too lenient on a loan if the borrower adds a fancy new cooking recipe to the collateral.

Think 1st of Tulsa



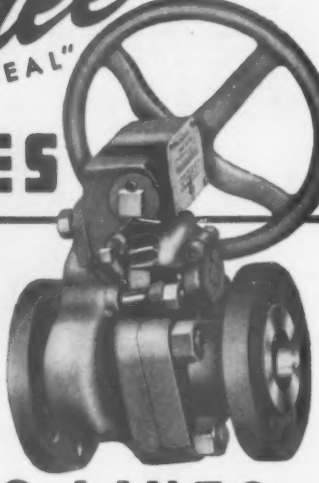
THE FIRST
NATIONAL BANK AND TRUST
COMPANY OF TULSA

Member Federal Deposit Insurance Corporation

When in Tulsa, you are cordially invited to visit our new building. See the FIRST Mural interpretation of the famous Oklahoma "runs."

APPROVED

Okadee "PERFECT SEAL" VALVES



for Bubble-tight Primary Shut-off in

L P GAS LINES

Underwriters' Laboratories, major LP gas producers*, and Liquified Petroleum Gas Commissions of several States* approve Okadee Valves for primary shut-off in LP gas lines. In addition, Okadee Valves are used in virtually all types of gas and liquid lines at pressures to 600 p.s.i. and temperatures to 800°F.—wherever a perfect seal, low maintenance and long life are necessary.

Get complete data, including material specifications, on Okadee Valves — and newest Underwriters' Laboratories test report—without obligation, today.

**Names on request.*

- **A. S. A. Standard dimensions**
- **Sizes from ½" to 6"**
- **Single- and double-seated disc valves**
- **Hard-faced valves and seats . . . perfect metal-to-metal seal**
- **Self-cleaning, self-compensating valve discs**
- **Lever, rack-and-lever, or worm-gear operation**
- **Non-lubricated**
- **No wedge action**
- **Valves and seats wear in instead of "wearing out"**
- **All parts quickly replaceable in the field**
- **Inside and outside stem packing . . . double assurance against stem leaks**

Underwriters' Laboratories Reexamination Service Guide No. 141 A3.1.22, File MH5163. SL Screwed Type Series and Series 15 and 30 Flanged Type Okadee Valves are suitable as a positive shut-off in LP gas pipelines and other LP gas applications for a working pressure of 250 p.s.i.

Write for Bulletin No. 51FL

OKd. **Okadee COMPANY**
332 South Michigan Avenue • Chicago 4, Illinois

⅛-in. choke. Working pressure registered 4,500 psi. with 47.7° gravity.

SOUTH LOUISIANA SUCCESSFUL WILDCAT

Plaquemines Parish: Oil discovery—Woods Oil & Gas Co. 1 Dr. B. R. Slater, 6-18s-27e, TD 11,337 ft., IPF 80 bbl. oil per day, TP 3,200, 10/64-in. choke 42.5° gravity.

SOUTH LOUISIANA WILDCAT FAILURES

Livingston Parish: Gaylord Container Corp. 2 Fee, 22-7s-5e, dry, TD 9,010 ft.

Plaquemies Parish: The Texas Co. 2 St. Le. 1953-Blk. 22, Breton Sound, dry, TD 9,250 ft.

The California Co. 1 Calif.-Humble, 13-20s-29e, dry, TD 12,055 ft.

The California Co. 2 John Vela, no location given, dry, TD 11,396 ft.

Terrebonne Parish: Humble Oil & Refining Co. 2 LL&E "E," 14n-21w, dry, TD 13,662 ft.

Eastern Texas

Confirmation of New Field Assured Near Marshall

DALLAS.—A rich gas-distillate producer and confirmation well to Cock-Pettit field 12 miles southeast of Marshall has been assured at Tom Potter 1 Laura Shaw estate, approximately ½ mile southwest of the discovery.

A test through open 2-in. tubing on perforations in the lower Pettit at 6,684-95 ft. developed an estimated 60,000,000 cu. ft. of gas a day plus distillate at the rate of 100 bbl. per 1,000,000 cu. ft. Flowing pressure was 760 psi.

Potter and associates are drilling ahead at the 2 Cock, ¾-mile north of the discovery and were preparing to drill 1 Arant about 1 mile southeast of the 1 Cock, in the J. W. Sawyer Survey.

Hollandsworth Oil Co. has made location for another venture on the east side of the Pine Mills townsite in Wood County at its 2 Ethel Reed Bogan. Location is in the S. H. Davis Survey, on a 62.5-acre tract. Projected depth of 7,000 ft. would test the Woodbine.

Humble Oil & Refining Co. will drill its 1 Mack Williams as a 12,500-ft. exploration some 2 miles northeast of Sandusky field in Grayson County. Location is in the Didnisio Yglasias Survey, 1 mile west of Gordonville.

J. R. and Adam Seitz spotted location for 1 R. J. Haining as a 6,500-ft. wildcat 7 miles east of Collinsville in the west-central part of Grayson County. Location is in the Joseph Williams Survey, A-1,302.

Production tests were under way at Humble 1 Fred Maberry, Freestone County deep wildcat which plugged back from 13,595 ft. to 7,335 ft. First set of perforations were from 6,958-68 ft.

EAST TEXAS (DISTRICTS 5 AND 6) SUCCESSFUL WILDCATS

Titus County Phillips & Stephens 1 F. H. Anschultz, M. J. Davis Sur., TD 4,407 ft., elev. 328 ft., perf. Paluxy 4,387-95 ft., IP pumped 204 bbl. 18°-gravity oil.

Wood County D. R. Snider 1 L. A. Capps, W. P. King Sur., TD 4,407 ft., pay

4,372 ft., IP 136 bbl. 22°-gravity oil, TP 50 psi., GOR 100 cu. ft.

EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT FAILURE

Denton County Connally & Jackson 1 M. H. Range, M. Polk Sur., dry, TD 4,100 ft.

Texas Gulf Coast

Oil Production Opened on Danburry Dome Flank

HOUSTON. — Oil production has been opened for the first time on the southwest flank of the Danbury dome, Brazoria County. The production was found in a new lower Frio sand in the Johnny Mitchell 1 Mayes et al, Austin Survey, A-13. The well flowed 231.84 bbl. of 33°-gravity oil daily plus 2 per cent water through a 10/64-in. choke, 9,963-9,718 ft. Tubing pressure was 1,300 psi. and gas-oil ratio was 1,930:1.

Production Maintenance Co. have opened a new oil reservoir in the Cockfield in Harris County. The discovery is 1 J. C. Guhn and hole is bottomed at 7,940 ft. with 5½-in. production string cemented to 7,400 ft. Location is on the Joseph Bays Survey, A-127.

J. P. Owen 1-A Doty and Jackson in Jackson-Doty field of Hardin County completed as a dual oiler in the 6,200-6,400-ft. zones. The tubing sand completion effected through perforations at 6,266-68 ft. with 8 shots flowed 168 bbl. of 40.2°-gravity oil per day on 9/64-in. choke with tubing pressure of 1,375 psi. and gas-oil ratio of 1,750:1. New well is on the W. N. Cox League, A-13, Hardin County.

Two and one-half miles northwest of Refugio the 2 John Mitchell is flowing oil from perforations at 4,767-73 ft. on a 10/64-in. choke. The 2 Mitchell was drilled by William F. Morgan and is located on the Isabella O'Brien Survey, Refugio County.

The 1 W. E. Bohem is new oil discovery drilled by Sam Harrison. Completion was from perforations in the lower Frio from 6,319-24 ft. On potential test well flowed at the rate of 32.2 bbl. of 42.2°-gravity oil per day on 10/64-in. choke with gas-oil ratio of 5,406:1. Hole is bottomed at 6,765 ft. with 5½-in. casing cemented to 6,363 ft. Location is in John Davis Survey, A-16.

Humble Oil & Refining Co. has reported a gas-condensate discovery at the 1 Grand Lake gas unit 1, in Montgomery County. On production test through perforations at 11,009-50 ft., well flowed at the rate of 190 bbl. of 45.6°-gravity condensate per day on ¾-in. choke with gas-liquid ratio of 9,570:1. Tubing pressure was 300 psi. and hole bottomed at 11,800 ft. with 5½-in. production string cemented to 11,401 ft. The discovery is on the Ransom House Survey, A-245.

Magnolia Petroleum Co. 1 Gracey-Wegenhoft, 14,381-ft. wildcat, has tested gas shows on drill-stem test in the 9,800-ft. zone. Test on perforations 9,866-9,916 ft., open 8 hours, had slight blow, no pressure, with recovery of 3,000 ft. water cushion, 720 ft. of gas and salt water-cut mud, 1,320 ft. of gas-cut mud, and registered bottom-hole flowing pressure of 3,205 psi. and 4,500 psi. shut-in pressure.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Chambers County: Kirby Petroleum Co. 1 E. W. Barber, Chambers County School Sur. A-352, dry, TD 8,300 ft.

De Will County: Humble Oil & Refining Co.

Use Ampco* Safety Tools

on every job where a spark can mean disaster

Once a fire starts, all you can do is fight to hold your loss to a minimum. But why take chances? A few dollars invested in Ampco Safety Tools today prevent the sparks that might start costly fires tomorrow. Such protection is the cheapest insurance you can buy.

That's why Factory Mutual Laboratories and other safety authorities approve and recommend Ampco Safety Tools for use in hazardous locations.

Select the right Safety Tool for every job from the more than 400 items that make the Ampco line the world's most complete. Your insurance rates are lower, your workers' efficiency higher because they feel more secure.

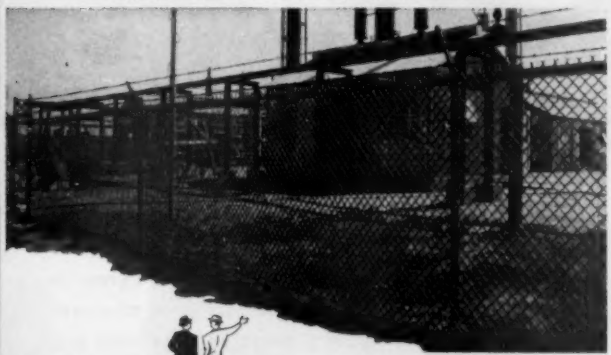
*Reg. U. S. Pat. Off.

AMPCO METAL, INC.
Dept. OG-6 Milwaukee 46, Wis.

In Canada — Safety Supply Company, Toronto

PAGE FENCE - Since 1883

• AMERICA'S FIRST WIRE FENCE •



Defense against hazards which could hinder or stop production is a major function of Page Chain Link Fence, guardian of persons and property for more than 60 years. NOW is the time to consult the skilled Page Fence erecting firm near you, whose name we will send with fence data on request and who will submit cost estimates, no obligation. For information

Write to PAGE FENCE ASSOCIATION in Monessen, Pa., Atlanta, Bridgeport, Chicago, Denver, Detroit, Los Angeles, Philadelphia, New York or San Francisco.

PRODUCT OF PAGE STEEL & WIRE DIVISION OF AMERICAN CHAIN & CABLE COMPANY, INC.

From Birkenhead to Digboi...

Throughout the world—the Middle East, the Far East, Europe and South America—Pyrene* Air Foam Equipment has long been *the* equipment for oil field and tank farm protection. Pyrene is available to you. Wherever *you* are—whatever *your* hazard—Pyrene is prepared to provide you with a built-in air foam system you can count on. For complete information, or the help of a Pyrene engineer, write us today.

*T.M. Reg. U.S. Pat. Off.

PYRENE MANUFACTURING COMPANY
579 Belmont Avenue, Newark 8, New Jersey
Affiliated with C-O-Two Fire Equipment Co.

Pyrene AIR FOAM

The Pyrene Company, Limited, England
Pyrene Manufacturing Co. of Canada, Limited

Engineering sales and service representatives: Stentz Equipment Co., P.O. Box 3367, Tulsa; also Dallas, Houston, Midland, Odessa • Horn Fire Equipment Co., 4917 Sheila, Los Angeles

1 John Macha, Berry Doolittle Sur. A-154, dry, TD 8,500 ft.
Galveston County: Sun Oil Co. 1 St. Tr. 174, dry, TD 7,277 ft.
Jefferson County: Meredith, Clegg & Hunt et al 2 W. C. Gilbert, Alva Jone Sur., Sec. 62, dry, TD 10,936 ft.
Karnes County: Jake L. Hamon 1 John Pawlek, Fernando Carrillo Grant Sur., dry, TD 6,235 ft.
Lavaca County: Dudley T. Dougherty 1-A Joseph Jares, A. G. Foley Sur., dry, TD 10,010 ft.
Liberty County: Atlantic Refining Co. 2 Nona Mills Co., Phillip Miller Sur. A-81, dry, TD 8,502 ft.
Montgomery County: Second M. E. Andrews, Ltd., 1 D. D. Granger, T&NO RR Sur. A-734, dry, TD 5,303 ft.
San Jacinto County: Thomas Concrete Pipe Co. 1 Carey-Haley, M. B. Menard Sur. A-36, dry, TD 9,765 ft.

California

Construction To Begin At Island Structure Soon

LOS ANGELES.—Announcement that construction was to begin before the end of the month on an island structure 1½ miles offshore from Seal Beach, adjacent to the proposed extension of the outer breakwater of San Pedro Bay, highlighted activity in California.

The $1,000,000 project is being undertaken by Monterey Oil Co., successor to Jergins Oil Co., and will test a state tidelands lease which a directional well some 6 years ago indicated might be oil productive. The test well was drilled from an upland location by Jergins.

Drilled in 45 ft. of water, the rock and sand-filled steel structure will be 75 ft. in diameter and will rise 30 ft. above water level. The project, which has been approved by the Army and other concerned governmental agencies, will be the first such offshore operation undertaken in California waters.

In the Castaic area of upper Santa Clara Valley a deeper pool discovery and what may prove to be a new fault-block find were recorded. At Santa Clara field the discovery well which Southern California Petroleum Corp. completed last July were drilled deeper and was being completed as a pumper in the Del Valle sand. The well, 1 Newhall Land in 20-4n-17w, was deepened by the operator from 9,022 ft. to 9,972 ft. and was producing through perforations at 9,600-9,972 ft.

The Texas Co. 2 Honor Rancho-2 extended that field two locations eastward and was being completed in the Rancho zone, the field's spotty upper pay. Since the sand was found unusually high, a lateral fault is believed to exist between the extensioner and Honor Rancho proper. Drilled to 8,000 ft., hole was plugged back to 4,083 ft. and 7-in. casing set at 4,025 ft. It was anticipated 2 Honor Rancho, located in NE SE 6-4n-16w, would be a small pumper.

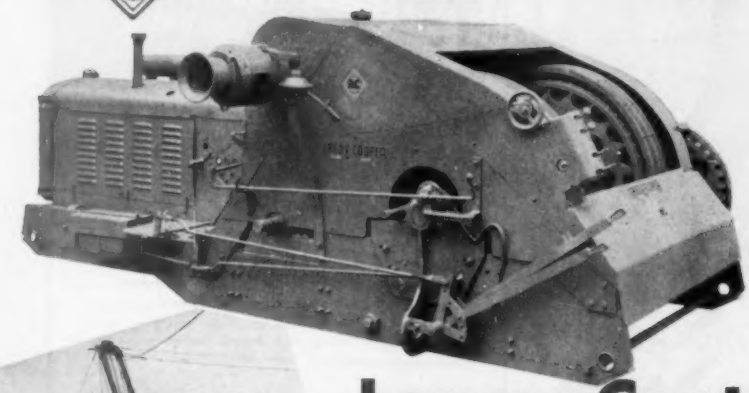
In Los Angeles Basin fields a development was the completion of a new discovery west of Brea-Olinda production by Union Oil Co. The extensioner, 46-33 Naranjal in 33-2s-10w, pumped 78 bbl. of 30°-gravity crude in 18 hours through perforation at 4,281-4,411 ft. It was plugged back to the lower depth after drilling to 7,468 ft. Union has staked location for an offset.

San Joaquin Valley activity included the

FRED E. COOPER INC. TULSA
HOUSTON · ODESSA LOS ANGELES
DRAW WORKS
SPUDDERS
WINCHES
POWER UNITS

For DEEP WORK

Use a Model L-844 unit



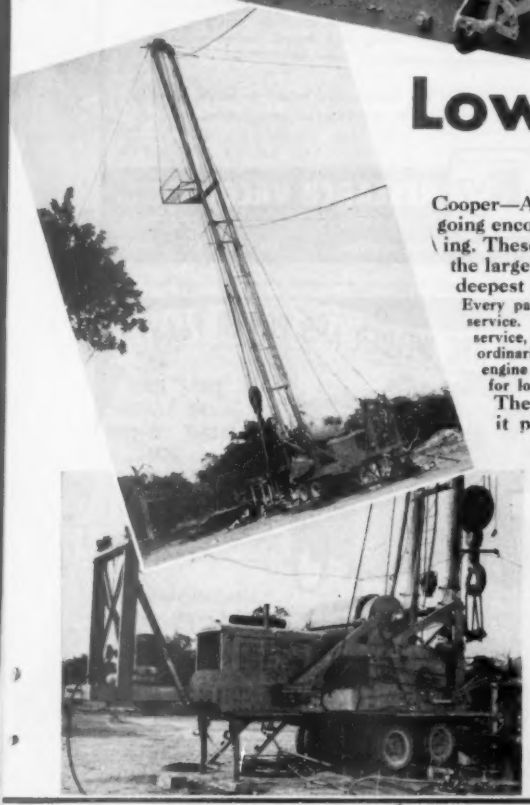
COOPER—ALLIS-CHALMERS MODEL L-844 FOR DEEPER SERVICING, WORKOVER AND DRILLING.

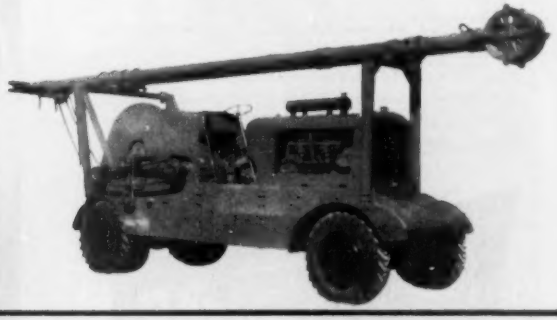
Lower Cost *always!*

Cooper—Allis-Chalmers model L-844 units are built to take the rough going encountered in deep well servicing, workover and medium drilling. These triple purpose units have greater brake capacity than even the largest rotary rigs; the 52″ dia. x 10″ wide brakes will handle the deepest jobs with ease and safety.

Every part of these machines is designed and built to withstand the most severe service. The heavy-duty four-speed transmission, built especially for oilfield service, is far stronger and heavier than automotive or truck type transmissions ordinarily used in this size servicing rig. The big Allis-Chalmers model L-844 engine used to power this rig has an enviable reputation throughout the oil fields for long trouble-free service and rugged lugging ability.

The method of mounting the engine on the draw-works makes it possible to properly distribute the weight on the truck or float, and makes them especially adaptable for mounting as trailer rigs or self-propelled tractor type units.





If you need a unit that will handle work-over and servicing from 6,000′ to 10,000′ and rotary drilling to 4,000′ it will pay you to see the COOPER—ALLIS-CHALMERS model L-844.

Regardless of the depth of wells, there is a Cooper—Allis-Chalmers Winch of the right capacity to do the job economically.

FRED E. Cooper, Inc.

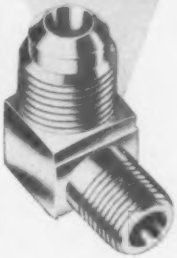
P. O. Box 1890 TULSA, OKLA.

Houston, Odessa, Los Angeles

NOW!

EXTRUDED BRASS

Tube and Pipe Fittings by WEATHERHEAD



3 ways better!

1. **NO SEEPAGE**—because entire part is machined from extruded bar stock, free from porosity.

2. **NO REJECTS**—because extruded stock provides a uniform fitting, always with the same angle, always with the same wrench grip.

3. **EASIER INSTALLATION**—because large, flat wrench pads permit a quick, tight grip, even in hard-to-get-at places.

For complete details ask for Industrial Catalog F-1456.

WRITE: **Department B-2, The Weatherhead Company, 300 East 131st Street, Cleveland 8, Ohio. In Canada: The Weatherhead Company of Canada, Ltd., St. Thomas, Ontario.**

The Mark of Quality

WEATHERHEAD

FIRST IN HYDRAULIC CONNECTIONS

HIGH VACUUM Glass Working and other Laboratory Equipment and Supplies

Send for this valuable bulletin on equipment for industrial plants. Features new glass working apparatus, such as oxygen - gas - hydrogen equipment, gas-air burners and automatic machine burners.

Also gum rubber tubing, hose clamps, vacuum systems and miscellaneous accessories.

You will find this bulletin very helpful—a handy reference book with over 100 illustrations of various items.

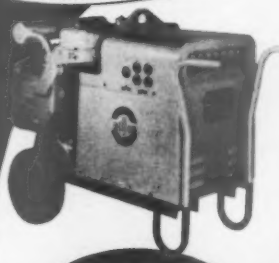
MANUFACTURERS RV DISTRIBUTORS

RESEARCH VACUUM SUPPLY COMPANY

Glass Blowing Equipment—High Vacuum Pumps and Accessories

3434 MONTROSE AVENUE • CHICAGO 18, ILLINOIS

AN ARC WELDER AND POWER PLANT THAT CAN BE TAKEN RIGHT TO THE JOB!



MODEL AEA-200-L

miller ENGINE DRIVEN A.C. ARC WELDER AND POWER PLANT

The only welder of its kind on the market today . . . an arc welder and power plant combined that you can take right to the job. Compact and easily portable . . . it is a welder that can be used both for power and for welding . . . power to operate lights, tools and other equipment. Its exclusive features warrant your immediate investigation.

Write today for complete details and the name of your nearest MILLER distributor.

miller ELECTRIC MANUFACTURING CO. SINCE 1929 APPLETON, WIS.

starting of a second confirmation test at Richfield Oil Corp.'s important Eocene sand discovery at Wheeler Ridge. The new test was Standard Oil Co. of California 356 Kern County Land in 28-11n-20w, about ½ mile southeast of the discovery. Richfield's south offset to the discovery was nearing 5,000 ft.

According to field reports Richfield is planning an early wildcat at Turk anticline, 21 miles north of Coalinga, and a second for the Rosedale area west of Bakersfield. The former is 1 Denlinger in NE 14-17s-15e, Fresno County, and will go to about 10,000 ft. The Kern County test will be 54-18 K.C.L. in 18-29s-27e, about 2½ miles east of Humble Oil & Refining Co.'s Rosedale development.

CALIFORNIA SUCCESSFUL WILDCAT

Sacramento County, new gas field discovery: Standard Oil Co. of California 1 Simms Community, SW NE 19-7n-5e, flowed at daily rate of 3,717 M.c.f. through ¼-in. choke from perforations at 5,778-88 and 5,873-75 ft., TD 7,000 ft., elev. not reported (well shut in following completion).

CALIFORNIA WILDCAT FAILURES

Kern County, Antelope Hills area: Enterprise area: Enterprise Oil Co. 1 Enterprise 8-28s-20e, dry, TD 5,280 ft., elev. 862 ft.

Jasmine area: Pacific Oil & Gas Dev. Co. 1 Quinn, 13-25s-27e, dry, Vedder 1,955 ft., TD 2,170 ft.

Old River area: Humble Oil & Ref. Co. 1 KCL-D (12-22), 22-30s-27e, dry, TD 10,750 ft. elev. 375 ft.

Poso Creek area: Canon Drilling Co. 4 Canon-Sally, 20-27s-27e, dry, TD 2,020 ft., elev. 706 ft.

Salt Creek area: Ferguson & Bosworth 46 Porter, 18-29s-21e, dry, TD 1,850 ft.

Los Angeles County, Bouquet Canyon area: Enterprise Oil Co. 1 Puckett, 33-5n-15w, dry, TD 3,992 ft., elev. unreported.

Madera County, Moffat area: H. H. Magee, Opr. 1-11 Stone, 11-12s-14e, dry, TD 4,053 ft., elev. 155 ft.

Orange County, Buena Park area: The Texas Co. 1 City of Fullerton, 36-3s-11w, dry, TD 10,020 ft., elev. 78 ft.

Irvine Ranch area: The Texas Co. 1 Irvine (NCT-1), 29-4s-8w, dry, TD 3,523 ft., elev. 680 ft.

San Luis Obispo County, Cuyama Valley area: Shell Oil Co. 1 Mackie, 19-11n-27w, dry, TD 7,938 ft., elev. 2,424 ft.

Louisiana-Ark.

Travis Peak Strike Completed in Union

SHREVEPORT.—Lawton Oil Corp. has completed B-4 Union Saw Mill, new Travis Peak sand discovery about 3 miles southwest of Hillsboro, Union County, Arkansas. The strike is located in SW SW 35-18s-14w. The well flowed 158 bbl. of 33°-gravity oil daily from open hole 3,480-3,519 ft.

Smackover lime production has been extended ¾ mile northeast in East Schuler field of Union County at Carter Oil Co. 1 B. M. Carroll in 18-18s-16w. The well flowed on latest gage 78 bbl. of 41°-gravity oil in 13 hours from 7,687-95 ft. in the Smackover porosity. Flow was through 9/64-in. choke. On a previous test the well flowed 103 bbl. of oil in 17 hours through 10/64-in. tubing choke. Company tests are continuing.

Louisiana.—Feazel Interests and Monla Gas Co., Inc., have officially completed 1 Breece Lumber Co. 113 ft. from south line, 165 ft.

PEAK POLISH ROD LOADS ELIMINATED

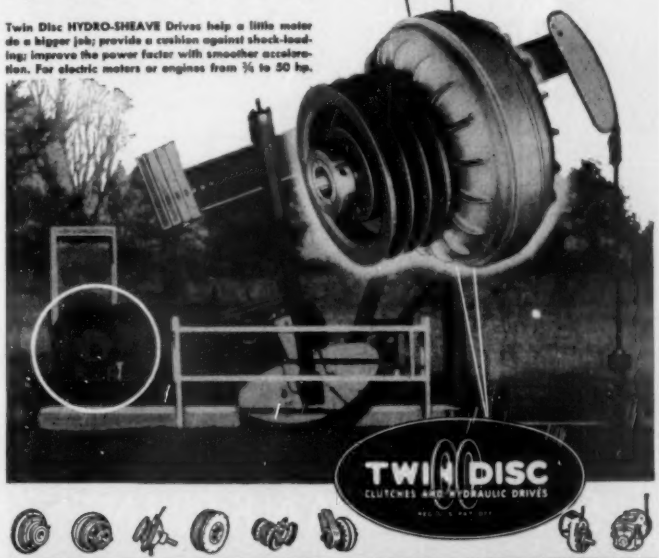
with TWIN DISC HYDRO-SHEAVE® DRIVES

Smoothing the power on 50 Cabot Pumping Jacks in the Ward S. Merrick holdings in the Graham Fox Pool and Bayou area of Carter County south of Lone Grove, Oklahoma, are Twin Disc's famous HYDRO-SHEAVE Drives. Bought to (1) increase pumping efficiency, (2) reduce initial motor cost, and (3) reduce excess current demands, these fluid drives *are* saving money on all three counts. That's why *more and more* HYDRO-SHEAVES dot the oil country.

Says Mr. Bob McChesney, Merrick Superintendent: "We are more than satisfied with the operation of the HYDRO-SHEAVE Drives due to smoother starting and the elimination of peak polish rod loads. Since using these units for the last three years we have had no belt failures. We are using 5 hp. motors on 4500 foot wells. Pumping units operating at this depth require 7½ hp. motors when not equipped with HYDRO-SHEAVE Drives."

Get the HYDRO-SHEAVE story from your nearest Twin Disc Hydraulic Drive dealer.

Twin Disc HYDRO-SHEAVE Drives help a little motor do a bigger job; provide a cushion against shock-loading; improve the power factor with smoother acceleration. For electric motors or engines from ¾ to 50 hp.



TWIN DISC CLUTCH COMPANY, Racine, Wisconsin · HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES: CLEVELAND · DALLAS · DETROIT · LOS ANGELES · NEWARK · NEW ORLEANS · SEATTLE · TULSA

from west line in NW 3-18n-5e, Ouachita Parish, flowing at the rate of 25,000 M.c.f. of gas plus 28 bbl. of condensate per day on calculated open flow. The new discovery has been named Swartz field.

Production is from 7,343-69 ft. opposite Bodcaw. Total depth is 7,980 ft. with casing cemented at 7,525 ft.

Pan Am Southern Corp. will dually complete 1 W. H. Teasley, C NW NW SE 20-17n-6w, confirmation to West Bryceland field, Bienville Parish. Neither of the pay zones found in the confirmation were found developed at the discovery.

LOUISIANA WILDCAT FAILURES

Claiborne Parish: Stanolind Oil & Gas Co. et al 1 Hannah Rainach, C N½ NW SE 17-22n-5w, dry, TD 11,000 ft.

Grant Parish: B. F. Phillips et al 1 Fee, C SE NE 30-8n-4w, dry, TD 4,160 ft.

ARKANSAS WILDCAT FAILURE

Ouachita County: Jack Carnes et al 1 J. T. Daniels, C SE SW 23-14s-17w, dry, TD 4,912 ft.

Permian Basin

Test at Floyd Prospect Unloads Clean Oil

MIDLAND.—Standard Oil Co. of Texas 1 Minnie Adams, southeastern Floyd County's prospective discovery, held up coring to clean out to total depth of 7,672 ft. Drill-stem test at 7,598-7,622 ft. unloaded clean oil while coming out of the hole and at 7,619-37 ft. recovery was 1,800 ft. of mud-cut oil.

Five miles southeast of Barstow in Ward County, Continental Oil Co. 1 Watson had prospects of production from the Wolfcamp. Top of the formation was 9,260 ft., with elevation not reported. A drill-stem test from 9,240-9,302 ft. had gas in 37 minutes and recovered 960 ft. of oil and gas-cut water blanket, 540 ft. of 40°-gravity oil, 650 ft. of slightly oil and gas-cut mud and 540 ft. of heavily oil and gas-cut mud. Operators drilled ahead following the test. Contract depth was 13,000 ft.

Elkhorn - Ellenburger field of Crockett County listed one completion and one probable extender, adding considerably to the pool's proved area. On the east side of the field, Continental Oil Co. 16-A Shannon gaged 586 bbl. of oil in 7 hours, through ½-in. choke from pay at 7,142-7,330 ft., for a calculated daily potential of 2,008 bbl. Top of pay was 7,058 ft. on derrick floor elevation of 2,691 ft.

Continental 18-A Shannon, ½-mile northwest of production, flowed approximately 17 bbl. of oil with no water in 1 hour on drill-stem test at 7,325-75 ft. Surface flowing pressure was 1,600 psi. Operators were running casing for completion.

In northwest Crockett County, Deep Rock Oil Corp. 1 Shannon flowed 38 bbl. of oil in 24 hours after being shut in for several days. The flow was from perforations in the Wolfcamp at 5,866-72 ft. Further testing and completion was scheduled.

In Andrews County, Gulf Oil Corp. completed its 1-LLL University for 117.5 bbl. of oil, plus some water, from perforations in the San Andres above 4,750 ft. The well was an Ellenburger failure to 13,070 ft.

While Coroco Drilling Co. prepared to make a dual completion at its 1 Atlas Life, Terry County discovery, a north offset was staked by Jake L. Hamon. The confirmation test was the 1 Lela Mae Green, contracted to 13,000 ft. Coroco's well was drilled to 13,245 ft. and will attempt completion from the Fusselman and Wolfcamp.

Both north and south extensions were reported for Adair field of Terry and Gaines counties. On the north end, Amerada Petroleum Corp. 3 Miller flowed 395 bbl. of oil a day through ½-in. choke from open hole at 8,520-57 ft. Top of pay was minus 5,283 ft.

Humble Oil & Refining Co. 3 Guetersloh, also a north extension, made a calculated daily potential of 1,352 bbl. of oil from perforations at 8,478-98 and 8,536-55 ft. Top of pay was minus 5,235 ft.

On the south end of the field, Atlantic Refining Co. 5-B Jones extended production ¼-mile with a daily flowing potential of 421 bbl. of oil through 24/64-in. choke, from perforations between 8,482-8,520 ft. Elevation was 3,188 ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

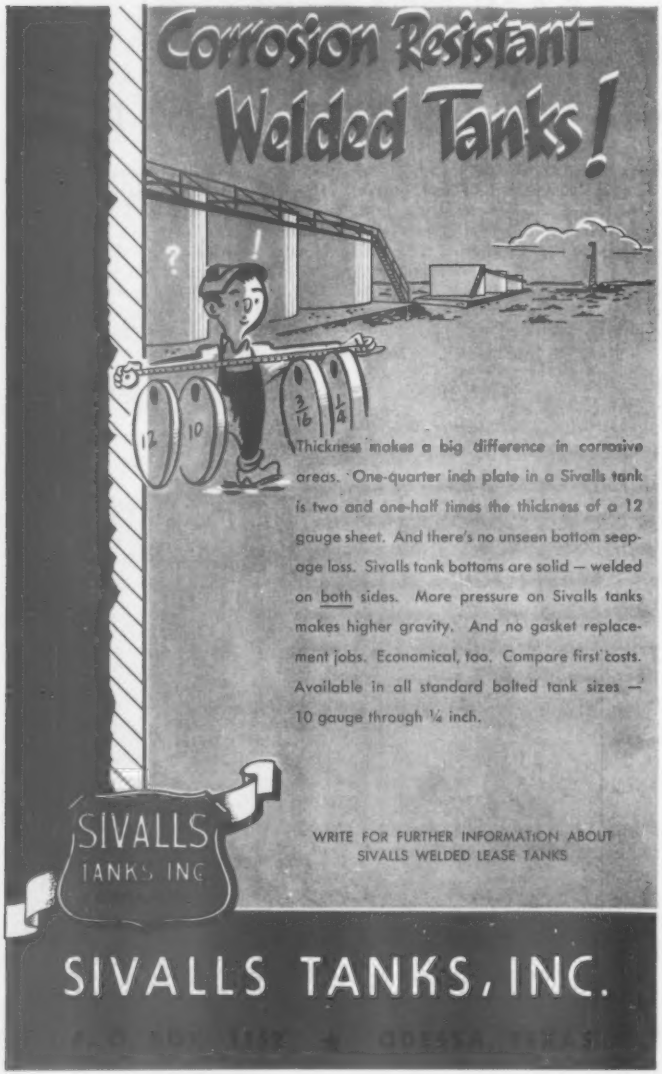
Dawson County: Standard Oil Co. of Texas 1 Huddelston-2, 1-H-EL&RR, TD 7,972 ft., elev. 3,085 ft., Spraberry 7,936 ft., IP pumped 147 bbl. 37°-gravity oil, GOR 364 cu. ft.

Runnels County: Pan American Production Co. 1 N. Currie, Sec. 163, ETRR Sur., TD 3,480 ft., perf. Palo Pinto 3,448-58 ft., IP 402 bbl. 39°-gravity oil, ¼-in. choke, TP 115 psi., GOR 222 cu. ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Coke County: Chicago Corp. 1 J. J. Warren, J. Johnson Sur. 996½, dry, TD 6,505 ft., elev. 1,835 ft., Ellenburger 6,168 ft.

Stanolind Oil & Gas Co. 1 B. D. Gartman, J. M. Perry Sur. 2, dry, TD 6,806 ft., elev. 2,130 ft., Ellenburger 6,701 ft.


Corrosion Resistant
Welded Tanks!
Thickness makes a big difference in corrosive areas. One-quarter inch plate in a Sivalls tank is two and one-half times the thickness of a 12 gauge sheet. And there's no unseen bottom seepage loss. Sivalls tank bottoms are solid — welded on both sides. More pressure on Sivalls tanks makes higher gravity. And no gasket replacement jobs. Economical, too. Compare first costs. Available in all standard bolted tank sizes — 10 gauge through ¼ inch.
WRITE FOR FURTHER INFORMATION ABOUT SIVALLS WELDED LEASE TANKS
SIVALLS TANKS INC
SIVALLS TANKS, INC.

HENRY H. PARIS DISTRIBUTOR Inc.

Manufacturer's Agent - Oil Well and Refinery Supplies

P. O. BOX 932 — 1125 ROTHWELL ST.

HOUSTON, TEXAS

Agent and Distributor for the following Nationally Known Manufacturers:

WHEELING MACHINE PRODUCTS CO.
Wheeling, West Virginia
XL Steel Pipe Couplings for OIL COUNTRY TUBULAR PRODUCTS.

VOLCANO BURNER COMPANY
Houston, Texas
Volcano Superior and Gulf States All Steel Gas Burners for OIL COUNTRY BOILERS.

THE OHIO INJECTOR COMPANY
Wadsworth, Ohio
OIC VALVES Bronze, Iron, Cast and Forged Steel for all purposes.

HARRISBURG STEEL CORPORATION
Harrisburg, Pennsylvania
Forged Steel Flanges and Seamless Casing Couplings.

GLOBE MACHINE & NIPPLE CO.
Houston, Texas
Arrow Brand Pipe Nipples—All Kinds.

DRESSER MANUFACTURING DIV.
Bradford, Pa.
Seamless Welding Fittings.

OIL STATES EQUIPMENT COMPANY
Houston, Texas
OSECO Silvertop Fusible Plugs with renewable inserts for all types Oil COUNTRY BOILERS.

WESTERN SAFETY BARREL STAND
Houston, Texas
Stand lifts, holds, tilts 55 gal. barrels. Prevents spillage—easily loaded.

STEEL FORGING, Inc.
Shreveport, La.
Weld Saddles and Weld Sleeves.

THE GORMAN-RUPP COMPANY
Mansfield, Ohio
Centrifugal Pumps

SAVE MONEY ON FREIGHT!

SHIP BY BARGE

TO AND FROM GULF AND INLAND PORTS

Write for Rates

COYLE

GENERAL OFFICES:
P. O. BOX 6056 - STATION A
NEW ORLEANS 14, LA.

COYLE LINES

INCORPORATED

BRANCH OFFICE:
CITY NATIONAL BANK BLDG.
HOUSTON 2, TEXAS

COYLE

SERVING PORTS ON GULF INTRACOASTAL WATERWAY—
TEXAS, LOUISIANA, MISSISSIPPI, ALABAMA, FLORIDA •
CONNECTING WITH ALL RIVER CARRIERS AT NEW ORLEANS, MOBILE

You're not seeing double... It's 2 machines in one!

Machine Printed Answers
Positive Multiplier Control
Automatic Printed Division
Single Key Depression
Automatic Credit Balance

UNDERWOOD SUNDSTRAND AUTOMATIC PRINTING CALCULATOR does the work of *two* different machines. Change from payrolls to inventories . . . from computing interest to figuring statistical calculations . . . *without changing machines.* Adds, subtracts, multiplies, divides.

It performs all various functions with the famous Touch Operated Underwood Sundstrand 10-Key Keyboard that speeds work, reduces fatigue, cuts errors.

UNDERWOOD CORPORATION
ONE PARK AVE., NEW YORK 16, N. Y.

THE VICTAULIC® METHOD OF PIPING

EASIEST WAY TO MAKE ENDS MEET

The VICTAULIC METHOD is a *comp'ete* line of Victaulic Couplings, Full-Flow Fittings and Vic-Groover Tools for mechanical piping construction. It's the easy way to hook-up pipe . . . it's fast and versatile . . . it's *complete and all-inclusive!* Use the VICTAULIC METHOD and you streamline piping . . . cut costs!

The Easy-to-use Victaulic Coupling . . . world-famous for quick, leak-proof connections . . . is the basic element of the VICTAULIC METHOD. For use with this coupling, Victaulic offers a complete line of top efficiency Full-Flow Elbows, Tees, Reducers and other Fittings . . . PLUS Vic-Groover Tools for preparing pipe ends easily and quickly right on the job!

Mis-alignments, expansion and contraction are automatically taken care of by Victaulic, locked-joint, leak-tight piping is assured. For new construction, repairs or alterations . . . for any piping job, big or small, the VICTAULIC METHOD *is the easiest way to make ends meet.*

The name VICTAULIC is more than a trademark . . . it stands for world leadership in a speedy, dependable piping method . . . backed by unexcelled engineering and years of proved experience. FOR YOUR OWN PROTECTION . . . be sure you get VICTAULIC!

Write today for Victaulic Catalog & Engineering Manual No. 44-O.F.

VICTAULIC
COMPANY OF AMERICA
P. O. Box 509 • Elizabeth, N. J.
Office and Plant: 1100 Morris Ave
Union, N. J.
Telephone: Elizabeth 4-2141

28th VICTAULIC YEAR

California: Victaulic Inc., 727 W. 7th St., Los Angeles 14
Canada: Victaulic Co. of Canada Ltd., 406 Hopewell Ave., Toronto 10
Export: Pipe Couplings, Inc., 30 Rockefeller Plaza, N. Y. 20, N. Y.

Copyright 1952, by Victaulic Co. of America

Union Oil Co. of California 1-A Stewart, 267-1A-H&TC, dry, TD 4,996 ft.

Crockett County: M. H. Halff 1 Halff-Rivins, 52-L-I&GN, dry, TD 1,837 ft., Yates 1,050 ft.

Menard County: Sheets and Walton Drilling Co. 1 Wilkinson, W. J. Wilkinson Sur. 220, dry, TD 3,470 ft., Ellenburger 3,260 ft.

Pecos County: C. L. Hay 1 Seale, 44-11-H&GN, dry, TD 3,070 ft.

Runnels County: Kewanee Oil Co. 1 Shaw, 33-A287-H&GN, dry, TD 4,465 ft., elev. 1,780 ft., Strawn 4,018 ft., Caddo 4,390 ft.

Bouchard & Callihan Rotary Co. 1-A Mitsch, D. Floyd Sur. 518, dry, TD 4,870 ft.

Leonard & King 1-A Evans, 109-29-EL&RR, dry, TD 2,405 ft.

B. C. Morrison 1 Ira Deakins, Sec. 110, J. M. Parker Sur., dry, TD 3,603 ft.

Murray Petroleum Co. 1 P. G. Sturm, H. C. Wylie Sur. 166, dry, TD 4,490 ft.

Twin Oil Co. 1 Spreen, Sec. 229½, L. M. Lee Sur., dry, TD 3,555 ft., Palo Pinto 2,885 ft.

Schleicher County: Cities Service Oil Co. 1-B Robinson, 67-I-GH&SA, dry, TD 6,225 ft., elev. 2,405 ft., Pennsylvanian 5,091 ft., Ellenburger 6,066 ft.

Pure Oil Co. 2 J. S. Roach, 1,200-B-Georgetown RR Sur., dry, TD 7,323 ft., elev. 2,545 ft.

Wick Oil Co. 1 Harris, 75-H-GH&SA, dry, TD 6,095 ft., elev. 2,350 ft., Canyon 4,548 ft., Strawn 5,322 ft., Ellenburger 5,690 ft.

Tom Green County: Bridwell, Perkins and Protho 2 Llano CSL, Tract 33, Llano CSL 964, dry, TD 6,691 ft., elev. 2,147 ft., Ellenburger 6,480 ft.

Ward County: Garlitz & Stricklin 1 C. H. Smith, 15-B-29-PSL, dry, TD 3,025 ft., elev. 2,550 ft., Yates 2,348 ft.

Yoakum County: Joseph I. O'Neill 1 Mattie Clark, 11-K-PSL, dry, TD 7,513 ft., elev. 3,602 ft., Clear Fork 6,310 ft., Tubb 6,975 ft.

TEXAS PANHANDLE (DISTRICT 10) WILDCAT FAILURE

Ochiltree County: The Texas Co. 1 Swink, 121-13-T&NO, dry, TD 8,812 ft., elev. 3,056 ft., Douglas 5,590 ft., Atoka 8,260 ft.

SOUTHEASTERN NEW MEXICO

Gulf Oil Corp. 1-AN State, Lea County wildcat in 27-13s-33e, had prospects of discovery production in the Pennsylvanian, or Permo-Pennsylvanian, on the basis of a drill-stem test around 9,589-9,644 ft.

On the test, gas surfaced in 4 minutes and oil in 20 minutes. On a 2½-hour gage, the well tanked 166 bbl. of 42°-gravity oil. Flowing pressure ranged from 1,360-2,030 psi. There was no water in the drill pipe recovery. It was to core ahead.

Top of the formation at 9,252 ft., minus 4,806 ft. was reported as 73 ft. high structurally to The Texas Co. 1-AT State, recent discovery 3 miles south.

Shell Oil Co. has staked location for 1-CA State, Leo County wildcat 1¼ miles northwest of Lovington field in 23-16s-36e. Projected depth was 12,500 ft.

The Texas Co. staked 1-BP State in 26-11s-32e as a ½-mile west offset to its 1 Moore, recent Devonian discovery.

The firm's 1-BB State, north offset to Amerada 1-ECA State, Devonian discovery, developed 9,090 ft. of oil and 270 ft. of drilling mud on a 2½-hour drill-stem test at 11,185-225 ft. The section was not identified, but was thought to be Devonian.

SOUTHEAST NEW MEXICO SUCCESSFUL WILDCAT

Eddy County: Continental Oil Co. 1 Gertrude Duffield, 21-16s-27e, TD 10,188 ft., elev. 3,573 ft., pay 8,616 ft., IP 30 bbl. 66°-gravity oil, 3,800,000 cu. ft. of gas, ½-in. choke, TP 7,943 ft.

SOUTHEAST NEW MEXICO WILDCAT FAILURES

Chaves County: Hassie Hunt Trust 1 Manry Elliott Federal, 22-11s-31e, dry, TD 11,066 ft., elev. 4,482 ft., Abo 7,217 ft., Wolfcamp 8,345 ft., Mississippian 10,325 ft.

Malco Refining Co., Inc. 1 Oliver-Federal, 14-15s-28e, dry, TD 3,522 ft., elev. 3,711 ft., San Andres 2,139 ft., Glorietta 3,499 ft.

Mississippi

Gas Tested in Second Zone at Forrest Well

JACKSON.—In southern Forrest County, Mississippi, Ohio Oil Co. is testing gas from a second zone in 1 Coleman-Powe, 5-1s-12w. First testing was from perforations 8,318-41 ft. opposite lower Tuscaloosa sand from which the well flowed at the rate of 3,137 M.c.f. gas plus 125 bbl. of 59.8°-gravity condensate through ¼-in. choke with top pressure 2,450 psi. Operators set a bridge plug at 8,235 ft. and are testing from perforations 7,303-20 ft. Final completion will probably be made from this zone.

Lion Oil Co. 2 Denkmann, deep Smackover wildcat, located in 22-7n-4e, Rankin County, Mississippi, was tested over a very short time from open hole below casing at 15,773-16,276 ft. total depth. The well flowed wash water, mud, and non-inflammable gas with tubing pressure 2,850 psi. on ¼-in. choke. The well was then killed with 6,500 psi. pressure and hole was plugged back to 15,621 ft. Casing has been perforated 15,585-604 ft. with 36 shots.

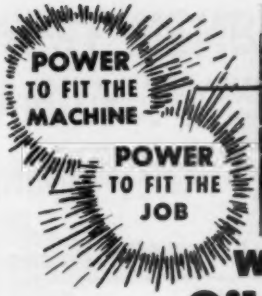
In the northeast corner of Pearl River County, Mississippi, Sun Oil Co. 1 Hurst et al, Section 8-1s-17w, has encountered shows of gas in the lower Tuscaloosa. Recovery from core at 8,910-20 ft. was 10 ft. of sandstone with slight gas odor, but recovery from drill-stem test of this section was only 180 ft. of mud and water. Another show of gas was reported in the bottom 4 ft. of core at 9,030-37 ft. A drill-stem test was run at 9,034-42 ft. using ¼-in. chokes and 2,520 ft. of water cushion. Tool was left open for 35 minutes with top pressure being only 1 psi. After 2 stands of drill-pipe had been pulled, gas unloaded the water cushion. Final recovery was 30 ft. of mud and 20 ft. of condensate cut with mud and water. Bottom hole pressure was 2,300 psi. flowing and 4,130 psi. shut in.

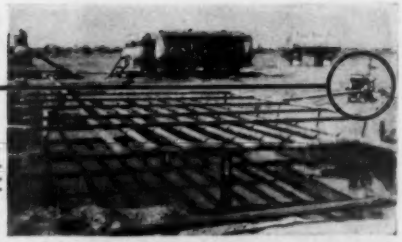
The deep test in Baxterville field, Gulf Refining Co. 25 Andrews, Section 6-1n-16w, Lamar County, Mississippi, recovered 1 ft. of sand with good fluorescence but no odor from a core at 11,766-793 ft., and 7 ft. of same sand from core at 11,846-87 ft. No drill-stem test was run. At last report this well was drilling ahead below 11,878 ft.

MISSISSIPPI WILDCAT FAILURES

Adams County: Humble Oil & Refining Co. 1 R. Hicks Barker et al, 35-7n-1w, dry, TD 6,500 ft.

Lauderdale County: Stack & Johnson 1 S. V. Miles, 2-7n-14e, dry, TD 4,518 ft.





WISCONSIN-Powered Oil Field Pump!

Water becomes especially vital if it's used to cool compressed air coils when "drilling with air." This is another important pumping task for Wisconsin Heavy-Duty Air-Cooled Engine power.

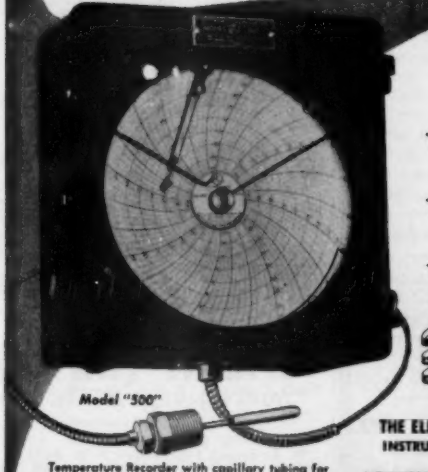
Actually, Wisconsin Engines work everywhere powering oil field equipment, and why not? You can't find features like these within any other unit, 3 to 30 hp. Each end of every crankshaft rides on tapered roller bearings. Bearing failure is unheard of. Also, put a Wisconsin to work, summer or winter, far from constant attention, and you know the work will be done. These additional features assure you that the "pay off" is in *performance plus*. Every Wisconsin is built to deliver because of fool-proof air-cooling and an easily-serviced OUTSIDE magneto with impulse coupling for quick starts and steady running.

4-cycle single-cylinder, 2-cylinder and V-type 4-cylinder models, 3 to 30 hp.

WISCONSIN MOTOR Corporation
MILWAUKEE 46, WISCONSIN
World's Largest Builders of Heavy-Duty Air-Cooled Engines

WRITE TO HARLEY SALES CO.
619 S. MAIN STREET, TULSA, OKLAHOMA
M & M BUILDING, HOUSTON, TEXAS
505 SOUTH MAIN ST., WICHITA, KANSAS
OUR FIELD DISTRIBUTORS FOR WISCONSIN ENGINES AND ALL TYPES OF UTILITY UNITS.

AUTO-LITE



Temperature Recorder with capillary tubing for EYE-LEVEL reading. Priced from $42.50.

...for TEMPERATURE RECORDING

★ This low-cost protection gives permanent proof of temperature behavior.

★ Various standard chart ranges from minus 40°F. to plus 550°F.

★ 3 standard types; choice of 24-hr. or 7-day cycle.

Send for new catalog G-143-B, describing many styles of Auto-Lite temperature indicators and recorders.

THE ELECTRIC AUTO-LITE COMPANY
INSTRUMENT AND GAUGE DIVISION
TOLEDO 1, OHIO
NEW YORK • CHICAGO • SARNIA, ONTARIO

TEMPERATURE RECORDERS & INDICATORS

below 800° F.

Accurate

TEMPERATURE READINGS

in a few seconds . . .

XACTEMP

Low Temperature - General Purpose

HAND PYROMETER

Type LT-840
Low temperature Xactemp Pyrometer with rigid extension arm and surface tip thermocouple.

1001 USES

This is the answer to quick, accurate temperature readings below 800° F. in many industrial processes and operations. And it's so convenient to handle.

The Xactemp hand-type pyrometer, Model LT-840, is used with needle thermocouples, ribbon thermocouple, surface tip thermocouple, and other specially designed thermocouples and extension arms. These are easily interchangeable and, without adjustments or recalibration of the instrument, quickly ready it for measuring the surface temperature of stationary and revolving rolls and cylinders, flat and irregular surfaces of molds, dies, etc. in rubber and paper making, plastic materials, rubber, wax, oils, greases, and other semifluid materials.

Handy, compact design makes this Xactemp pyrometer ideal for field service, laboratory, and production-line use.

Price Xactemp Pyrometer less thermocouples $51.50

Write for detailed, descriptive literature on Gordon Xactemp Pyrometers.

GORDON SERVICE

CLAUD S. GORDON CO.

Manufacturers & Distributors

Thermocouple Supplies • Industrial Furnaces & Ovens
Pyrometers & Controls • Metallurgical Testing Machines

Dept. 29 • 3000 South Wallace St., Chicago 16, Ill.
Dept. 29 • 2035 Hamilton Ave., Cleveland 14, Ohio

Wayne County: Humble Oil & Refining Co. 1 Foye McIlwain, 33-9n-5w, dry, TD 7,010 ft.

ALABAMA WILDCAT FAILURE

Butler County: Gulf Refining Co. 1 B. W. Hendrix, 26-7n-13e, dry, TD 9,480 ft.

FLORIDA WILDCAT FAILURE

Collier County: Humble Oil & Refining Co. 3 Collier Corp., 34-50s-26e, dry, TD 2,515 ft.

North-Central Texas

Montague County Drilling Continues at High Pace

WICHITA FALLS. — Drilling continued high in Montague County, with some tests indicating possible new production.

Joe Reznick 1 Mrs. Mitchell, wildcat 2½ miles southwest of Belcherville, had top of the Caddo at 5,565 ft., on elevation of 877 ft. Drill-stem test at 5,566-5,600 ft., open 1 hour and 45 minutes, recovered 100 ft. of oil and 180 ft. of heavily oil-cut mud.

Top of the first conglomerate at 5,626 ft., and tested between 5,626-33 ft., developed salt water with no shows. A test in the second conglomerate at 5,644-65 ft. returned 170 ft. of gas, 270 ft. of salty mud and 1,060 ft. of salt water. Operators were drilling ahead at 5,720 ft.

Eight miles southeast of Montague, George S. Engle 1 S. J. Brown estate was drilling below 7,103 ft. in shale and lime following a test on gas shows between 6,895-6,923 ft. recovered 600 ft. of gas, 25 ft. of gas-cut mud and a light show of oil.

Jack Mercer and Marshall Supply Co. 1 J. L. Miller, Montague County wildcat, developed 160 ft. of free oil and 90 ft. of heavily oil-cut mud on a 2-hour test at 3,092-3,103 ft. Operators were running pipe for production tests.

Star Oil Co. 2 Rhodes, Jack County wildcat 5 miles southeast of Bryson, had pipe set at 4,637 ft. to test two distillate shows. First test at 4,455-75 ft. recovered 2 gal. of distillate, with flowing pressure of 250 psi. and 20-minute shut-in pressure of 1,600 psi. Second test at 4,533-46 ft. had 20 ft. of distillate in the drill pipe after flowing gas for 45 minutes.

Russell Maguire made location for 1 Van Wert as a 6,000-ft. Jack County wildcat 3½ miles south of Jacksboro in the J. E. Hopkins Survey, A-254.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Archer County: Perkins & Cullum 1 Conner, A. D. Palmer Sur. A-342, TD 5,175 ft., pay 5,150 ft., IP pumped 90 bbl. 41°-gravity oil.

O. C. Sherley 13-B Ickert, Blk. 17, I. Holman Sur., TD 1,221 ft., pay 1,215½ ft., IP pumped 20 bbl. 39°-gravity oil.

Callahan County: L. A. Warren 1 J. W. Brown, Sec. 1, SPRR, TD 1,011 ft., pay 1,007 ft., IP pumped 8 bbl. 38°-gravity oil.

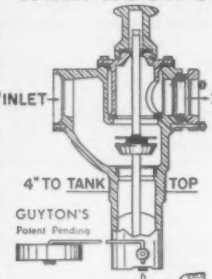
Cooke County: R. B. Hollandsworth 1 Stanford, D. Bullock Sur. A-110, TD 1,589 ft., pay 1,583 ft., IP pumped 61 bbl. 39°-gravity oil.

W. F. Russell 1-A Randall, J. N. Redman Sur. A-874, TD 1,610 ft., pay 1,597 ft., IP pumped 13½ bbl. 38°-gravity oil.

Fisher County: General Crude Oil Co. 1 Mrs. G. T. Webb, 210-3-H&TC, TD 5,612 ft., elev. 2,167 ft., pay 5,590 ft.,

Save

MONEY ON STOCK TANK HOOK-UPS!



You can save both time and money with this stock tank routing valve with these outstanding features —

1. Save cost of labor and material on original hook-up.
2. Save pumper mileage returning to top-out tanks.
3. Prevent fire hazards of overflowing tanks.
4. Save checking of pipe line strapping.
5. Eliminates overflow line.
6. Eliminates manifolding line.

Write for complete bulletin.

MURDOCK

TANK & MFG. CO.

TULSA, OKLAHOMA

Be sure the connections ARE LEAK PROOF!

Make them up with RECTORSEAL!

• You'll never have to worry about connection leaks on Fuel, Water and Air lines; Tubing and Casing connections when you make them up with RECTORSEAL. Apply Rectorseal directly from the container. It sets-up quickly to a plastic elasticity that positively seals the connection . . . and keeps it sealed until broken-out.

Ask for Rectorseal by name at your Supply Store. If they can't supply you, write

RECTORSEAL, Dept. D
2215 Commerce St., Houston 2, Texas

RECTORSEAL

Manufactured by
RECTOR WELL EQUIPMENT CO., INC.
Fort Worth, Texas

MAKING THE OIL INDUSTRY SAFER

MEET THE NEWEST MEMBER of PACIFIC'S FAMILY . . .

Figure Number 450

NOW !

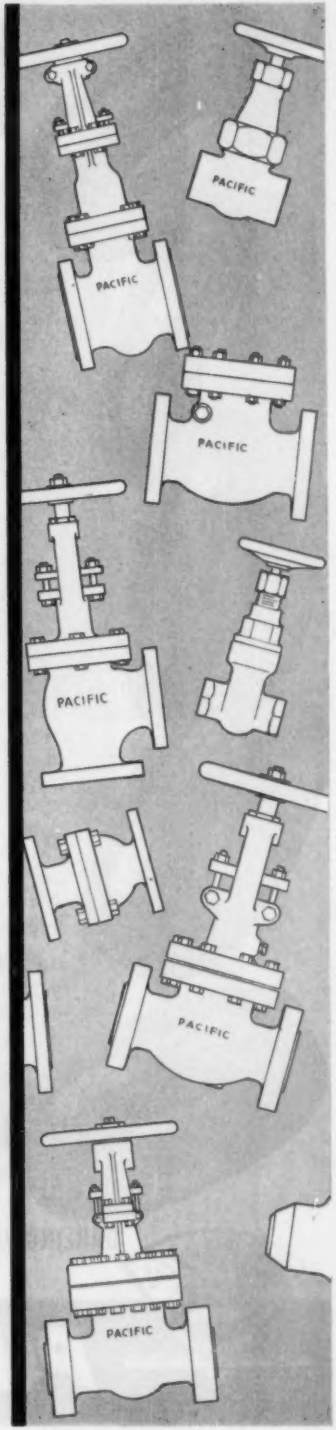
A COMPLETE LINE

Pacific Valves' line of Cast Steel Valves now include the 400 Lb. Series Gate, Globe and Swing Check Valves, available in most popular sizes. This Series of valves rounds out the Pacific line that now includes the 150 Lb., 300 Lb., 400 Lb., 600 Lb., 900 Lb., and 1500 Lb. Series. These 400 Lb. valves comply with all applicable A.S.A. and A.P.I. specifications. Body and Bonnet are regularly cast of A.S.T.M. A216 Grade WCB steel . . other alloys are available. Standard Trim material is 12% Chromium Stainless Steel . . . 14 other trim materials are available.

Figure Number 450
400 Lb. Cast Steel
GATE VALVE

features

- Straight thru Ports
- Fully Guided Wedge
- Deep Stuffing Box
- Lantern Ring
- Stainless Trim
- Back Seat in Bonnet
- Nickel Alloy Yoke Sleeve Bushing
- Husky Tee Head Stem Wedge Conn
- Heavy Duty Screw in Seat Rings

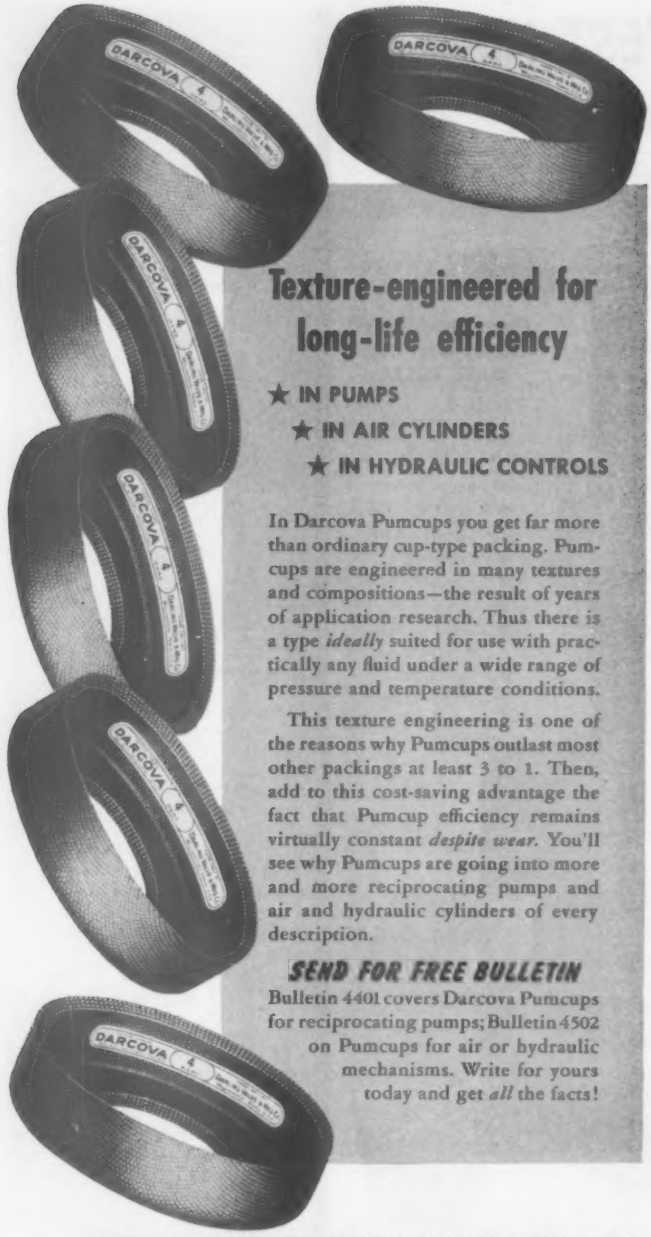


PACIFIC VALVES, INC.

3201 WALNUT AVENUE • LONG BEACH 7, CALIFORNIA

TELEPHONES: Long Beach 40-5451; Los Angeles NEvada 6-2325
TELETYPES: Long Beach 8-8076; New York City - NY 1-1077; Houston, Tex. - HO 489

Sales Offices In All Principal Cities



Texture-engineered for long-life efficiency

★ IN PUMPS
★ IN AIR CYLINDERS
★ IN HYDRAULIC CONTROLS

In Darcova Pumcups you get far more than ordinary cup-type packing. Pumcups are engineered in many textures and compositions—the result of years of application research. Thus there is a type *ideally* suited for use with practically any fluid under a wide range of pressure and temperature conditions.

This texture engineering is one of the reasons why Pumcups outlast most other packings at least 3 to 1. Then, add to this cost-saving advantage the fact that Pumcup efficiency remains virtually constant *despite wear.* You'll see why Pumcups are going into more and more reciprocating pumps and air and hydraulic cylinders of every description.

SEND FOR FREE BULLETIN

Bulletin 4401 covers Darcova Pumcups for reciprocating pumps; Bulletin 4502 on Pumcups for air or hydraulic mechanisms. Write for yours today and get *all* the facts!

DARLING VALVE & MANUFACTURING CO.
Williamsport 1, Pa.

DARCOVA
THE ORIGINAL COMPOSITION CUP

PUMCUPS

IP 129 bbl. 42°-gravity oil in 8½ hours, ¼-in. choke, TP 735 psi., GOR 612 cu. ft

Jack County: Jack Grace 1 Julia Dobson, E. Wray Sur., A-882, TD 3,368 ft., pay 3,358 ft., IP pumped 79 bbl. 41°-gravity oil.

Wise County: W. B. Ulmer 1 Peel, J. E. Roberts Sur., TD 3,893 ft., elev. 892 ft., pay 3,772 ft., IP 112 bbl. 42°-gravity oil, 126/64-in. choke, TP 125 psi., GOR 250 cu. ft.

Young County: W. B. Hamilton 1-B Morgan & Marshall, Sec. 3,410, TE&L Sur., TD 4,657 ft., elev. 1,178 ft., pay 4,653 ft., IP 155 bbl. 42°-gravity oil, 12/64-in. choke, TP 120 psi., GOR 300 cu. ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: Archer Drilling & Production Co. 2 Farmer, Wm. Baker Sur., dry, TD 1,291 ft.

Olin Calvin 1 D. L. Bishop, Blk. 10, W. E. Probert Sur., dry, TD 1,457 ft., Gunsite lime 1,420 ft.

Roy Davis and Olin Calvin 1 R. Campbell, J. Tomlinson Sur., dry, TD 1,160 ft.

H. D. Egger 1 Mrs. Montgomery Goodwin, Blk. 65, Harris Subd., dry, TD 1,485 ft.

McLaughlin & Craig 1 Bill Threet, Blk. 107, Jefferson CSL, dry, TD 1,163 ft.

The Texas Co. 1-F Wilson, Grayson CSL, A-739, dry, TD 4,042 ft.

Baylor County: Crown Central Petroleum Corp. 1 Maude H. Mitchell, Sec. 8, H&TB Sur., dry, TD 6,069 ft.

Coleman County: E. L. Dunn and J. B. Kerby 1 G. O. Green, J. Barnicoat Sur. 504, dry, TD 1,429 ft.

Cooke County: A. V. Grant 1 Dennis, J. S. Stump Sur., dry, TD 2,075 ft.

Eastland County: A&P Drilling Co. 1 Neal Dal, 16-6-ETRR, dry, TD 3,845 ft. Ellenburger 3,645 ft.

Haskell County: Bolin Oil Co. 1 H. L. Bosse, Caryell CSL, Sur. 60, dry, TD 4,709 ft.

Pure Oil Co. 1 Raymond Brewer, Chas. Irwin Sur., A-294, dry, TD 2,935 ft., elev. 1,518 ft., Swastika 2,545 ft., reef 2,904 ft.

Robinson-Puckett 1 J. C. Coleman, I. P. Wallace Sur. 57, dry, TD 5,397 ft., Caddo 5,109 ft., Bend 5,339 ft., Mississippian 5,363 ft.

Jack County: S. D. Johnson 1 R. H. Peterson, M. Putman Sur., A-465, dry, TD 3,976 ft.

Jones County: Clark & Cowden Production Co. 1 W. H. Shirley, 14-14-T&P, dry, TD 2,725 ft.

Moutray Moore Drilling Co. 1 Edgar Hall, C&MRR Sur. 4, dry, TD 2,152 ft.

Montague County: An-Son Petroleum Corp. 1 C. H. Dill, Ferrell Sur., A-272, dry, TD 6,451 ft.

Nolan County: Tom B. Medders 1 M. Y. McRorey, 249-1A-H&TC, dry, TD 4,284 ft., elev. 2,097 ft., Flippen 3,560 ft., Gunsite dolomite 4,045 ft.

Shackelford County: Brown Drilling Co. 1 Flippin, 40-11-T&P, dry, TD 1,180 ft.

W. M. Smith 1 E. R. Clemmer, 62-14-T&P, dry, TD 1,743 ft.

Stephens County: Woodson Oil Co. 1-B TXL, 3-5-SPRR, dry, TD 4,858 ft., elev. 1,255 ft., Caddo 3,512 ft., Mississippian 4,620 ft., Chappel 4,709 ft.

Stonewall County: K. Ellison 1 Pat Mitchell, 247-2-H&TC, dry, TD 6,332 ft., Caddo 6,230 ft.

C. L. Norsworthy, Jr. 1 J. W. Kennedy, 346-2-H&TC, dry, TD 6,123 ft., reef 5,807 ft.

R. E. Smith 1 C. E. Boyd, 11-D-H&TC, dry, TD 6,295 ft.

Skelly Oil Co. 1-A Boyd, 48-D-H&TC, dry, TD 6,271 ft., elev. 1,720 ft., Caddo

Here's another reason why

REED TOOL JOINTS *last longer*

This photograph of the screen of a thread comparator shows the enlarged profile of a **REED** Tool Joint thread. To an experienced inspector this picture indicates a virtually perfect thread form.

This comparator is just one of many **REED** inspection tools that help make sure the threads on the tool joints you get are absolutely accurate.

Thread accuracy is another important reason why **REED** TOOL JOINTS LAST LONGER!

REED ROLLER BIT COMPANY

HOUSTON 1, TEXAS

NEW YORK LONDON BUENOS AIRES

3481

Gulf Coast, Mid-Continent, Rocky Mountain and Canadian Distributor for Martin-Decker Products

HOW THICK IS THE WALL

only PENETRON

Can Tell You Quickly—On The Spot

Previously Accepted

$\frac{OD-ID}{2} = Average\ Wall$

$\frac{Wt}{Ft} = Average\ Wall$

But HOW ABOUT ECCENTRICS WORN SPOTS CORRODED SECTIONS ?

ASSURE THE SAFETY OF YOUR STRING

WITH *PENETRON-CHECKED* DRILL-PIPE

Hidden variations throughout the length of a pipe—potential kinks and breaks—spell costly down-time. *Only the PENETRON can tell you the wall thickness at any given point quickly, accurately and non-destructively in the field.* The tangential head with meter attached makes it a one-man operation to measure pipe wall thickness up to one inch, on diameters up to twelve inches ...Bends and turns too...with accuracy up to 3%. (The Penetron utilizes the principle of gamma-ray peneration and detection.)

PENETRON will tell you of deterioration of pipe and tubing where heat, corrosion or wear have had damaging effect. Use in checking:

HEATER TUBES . . . BOILER TUBES . . . FLUES . . . HIGH PRESSURE LINES . . . DRILL PIPE . . . REFINERY PIPE LINE CARRIERS . . . MANY OTHER USES.

FOR PENETRON SERVICE

Oil Field Service Co. R. D. Elliott 529 E. Roosevelt Rd. Long Beach, Calif.

United Engineers, Inc. B. I. Dikmen 874 E. 6th St. Tulsa, Okla.

Troy F. McCormick 670 - 98th Ave. Oakland California

Exclusive Manufacturers

UNITED ENGINEERS, INC.

820-24 East Sixth Street

Tulsa 3 Oklahoma

5,997 ft., Bend 6,176 ft., Mississippian 6,256 ft.

Taylor County: Miami Operating Co. 1 H. H. Webb, 156-64-H&TC, dry, TD 5,590 ft.

Throckmorton County: Ashland Oil & Refining Co. 1 E. N. McCluskey, Sec. 263, BBB&C Sur., dry, TD 4,702 ft., Caddo 4,641 ft.

Cox Drilling Co. 1 Virginia Cochran, Sec. 252, BBB&C Sur., dry, TD 5,035 ft.

Woodson Oil Co. 4 Brown-Condron unit, Account 1, Sec. 1,619, TE&L Sur., dry, TD 3,441 ft.

Oklahoma

Production Confirmed in New Logan County Field

FORDEE RHODES OIL CO. and Aberdeen Petrodeum Co. have confirmed their recent discovery of second Wilcox sand production in the area a mile south of the West Central School pool in Logan County, and also have proved another pay zone (first Wilcox sand) for the area at their 2 Mizura Allen, SW SE SW 27-17n-1e.

The new well, a location west of the discovery well (1 Allen), flowed 286 bbl. in a 15-hour period through various chokes while testing the second Wilcox sand in open hole at 5,088-5,133 ft. Testing the first Wilcox sand, opposite which casing is perforated at 5,006-12 ft., the well flowed 107 bbl. in 17 hours through 10/64-in. choke.

The second Wilcox sand is the producing zone of the West Central School pool, also a comparatively new area (opened last April). Indications are that the two areas eventually may join. They are located southeast of Coyle.

Several miles to the north in Section 9, across the Cimarron River in Payne County, and 1½ miles north of production in the Southeast Coyle pool area, Feagin Co.'s prospective discovery well, 1-A Cundiff, is testing a 6-in. interval in first Wilcox sand, opposite which casing is perforated at 5,108-08½ ft. The well flowed some fluid to tanks while cleaning through ¼-in. choke, but as this is written no gage nor estimate of the amount has been made. The fluid carried about 10 per cent water.

Sinclair Oil & Gas Co. seems assured of production from the Hart sand in its 1 Parr, C NW NW 19-3n-3w, third test in the Hart and Springer sand field recently opened by Phillips Petroleum Co. in western Garvin County. It now is drilling ahead to the Springer sand. A 60-minute drill-stem test in the Hart sand at 8,578-8,612 ft. got gas in 12 minutes, flowing at the rate of 316,000 cu. ft. per day, and recovered 3,450 ft. of 44°-gravity oil.

This well is the south offset to the discovery well, Phillips 1 Denson, completed last March in both sands, the Springer sand, perforated at 9,487-9,513 ft. and 9,531-57 ft., and the Hart sand, perforated at 8,586-8,632 ft. In the meantime, Phillips Petroleum Co. is continuing tests at its 1 Barb, C NE SW 18-3n-3w, northeast diagonal offset to the discovery well, in which Springer sand is perforated at 9,363-9,429 ft. and Hart sand at 8,590-8,626 ft. In a late reported test, the well was swabbing between 3 and 4 bbl. of oil per hour.

Following this new trend of Springer sand exploration and development along the eastern and northeastern rim of the Anadarko basin, Magnolia Petroleum Co. has made location for a deep test about 3 miles further northwest of the Phillips and Sinclair wells. Magnolia's test will be 1 L. P. Duncan, with

Look for this identification on

WHITMOR field homes—

it's Your Guarantee of Quality

On every distinctive Whitmor field home you will find a little metal identification — it's our way of saying that we are proud of that home — Proud enough to put our name on it. Behind it there are over 31 years of homebuilding experience — experience that means the difference between homes — or just housing! The Whitmor Home has been designed for employee comfort and company prestige . . . Many large oil companies have already seen the increase of employee efficiency and satisfaction. Yes, a Whitmor home is an investment in a sure thing "employee satisfaction" — this means that you are not just training employees for another company. . . . You demand the best employee — give him a home that he can be proud of! Give him a Whitmor distinctive field home.

"The Finest in the Field"

WHITMOR

homebuilders Inc.

5525 East 15th. Street • Tulsa, Oklahoma
Box 5037 • Phone 6-1137

You demand the best employees — They deserve the best homes

location in the NE NE SE 1-3n-4w, also in Garvin County. The trend at these points lies from 3 to 4 miles to the west of the "Golden Trend" development, where Springer sand is not present.

Exploration in the Anadarko basin is being expanded with the starting of two deep tests in Caddo County, one by Continental Oil Co. and the other by Deep Rock Oil Corp. The former company has made location for 1 L. V. Smith, C SE NW 32-10n-12w, 3 miles east of Eakly. It is scheduled to go to 13,500 ft. Deep Rock's projected test will be 1 Roy Griffin, C NE SW 31-12n-13w, in the extreme northwestern part of the county, near the juncture of the Custer and Washita county line. Objective of both tests is the Springer sand.

OKLAHOMA SUCCESSFUL WILDCATS

Comanche County: William H. Adkinson et al 1 Blumenshine, NE NE NE 12-2n-10w, pumped 5 bbl. oil daily from 2,352-67 ft., TD 3,316 ft. PBTD 2,372 ft. (originally completed dry, OWDD).

Hughes County: White & Harwell 1 Darby, NW SE NW 20-7n-9e, pumped 5 bbl. oil daily from Calvin sand at 940-55 ft., TD 955 ft.

Harry H. Diamond, Inc., et al 2 Spillman, NE NE NE 20-7n-9e, pumped 3 bbl. oil daily from lower Booch at 2,954-70 ft., TD 4,140 ft.

Logan County: Davidor & Davidor 1 Harned, NE SE SE 4-15n-2w, flowed 240 bbl. oil daily from Bartlesville sand at 5,519-29 ft., TD 6,145 ft.

Noble County: Wilcox Oil Co. 1 Carl, NE NE SW 17-20n-1e, pumped 95 bbl. oil daily from lower Cleveland 4,215-26 ft., TD 4,828 ft.

Okmulgee County: J. W. Gallagher 1 McInturff, SW SW NE 1-15n-13e, flowed 20 bbl. oil daily from sand at 1,793-1,806 ft., TD 1,806 ft.

OKLAHOMA WILDCAT FAILURES

Beckham County: Phillips Petroleum Co. 1 H. Flynn, SE SE 27-11n-23w, dry, TD 15,121 ft.

Carter County: Johnson & Gant 1 Heirston, SW SE SE 29-3s-2w, dry, TD 8,506 ft.

Cleveland County: Ashland Oil & Refining Co. 1 Smith, SE NE 1-9n-3w, dry, TD 10,147 ft.

Logan County: An-Son Petroleum Corp. 1 Beely, SE SE NW 3-19n-4w, dry, TD 4,787 ft.

Osage County: Mid-Continent Petroleum Corp. 1 Osage, SW SW NE 15-26n-5e, dry, TD 3,109 ft.

Pontotoc County: George F. Getty 1 Borrough, NE SW SW 11-2n-7e, dry, TD 1,801 ft.

Seminole County: J. Horwitz 1 Rose, NE NW SW 10-11n-7e, dry, TD 4,630 ft.

Washita County: Helmerich & Payne 1 Britton, NE NE 28-9n-17w, dry, TD 8,428 ft.

Woods County: The Texas Co. 1 Government, NE NE SE 29-23n-13w, dry, TD 8,394 ft.

Appalachian-Ohio

New Wildcat Located In West Virginia

PITTSBURGH.—In Glade district, Webster County, West Virginia, Gregory Gas Co., located 1 I. N. Gregory wildcat, elevation 2,305 ft. Cowen Quadrangle.

Maryland.—Garrett County: Mid Atlantic Oil & Gas Co. 2 Oren T. Graser, elevation 2,387 ft., reached the Oriskany sand at 3,378 ft., and is drilling at 3,463 ft. New York State Natural Gas Corp. 2-N-247 Shaw is drilling in a bad hole at 7,025 ft. Eberly & Snee 3 Gordon is shut down at 4,091 ft. Cumberland & Allegheny Gas Co. 2 Jasper Riley is drilling at 1,240 ft., and 1 Noah Shrock at 550 ft. Heath 1 H. C. Gibson is drilling at 4,030 ft., with no markers yet reported below the chert which was recorded at 3,587 ft.

Pennsylvania.—Unity Township, Westmoreland County, southwest Pennsylvania: Peoples Natural Gas Co. 4003 A. J. Dotterway, elevation 2,094 ft., is drilling at a depth of 8,200 ft. and 4008 J. R. Frola at 2,217 ft.

OHIO

The Mid East Oil Co. completed two wells in new Mount Zion pool in Jackson Township, Knox County. The 1 Lola Thompson, Section 18, with sand at 2,912-72 ft. made 60 bbl. in 72 hours natural, and 150 bbl. in 24 hours after shot. A quarter mile to the west, the 1 Gladys Griffith, Section 24, with sand at 2,985-3,048 ft., made 25 bbl. natural, and 170 bbl. in 24 hours after shot. At the west end of Bladensburg pool, Shuff and Bucy 6 Davidson, Section 15, showed 5 bbl. natural and 112 bbl. in 24 hours after shot. Clinton sand was logged at 2,715-48 ft.

Pure Oil Co. has made a location on Donald Root, Lot 5, Jefferson Township, Coshocton County, for a Clinton wildcat test.

OHIO WILDCAT FAILURES

Washington County, Barlow Township: Benedum-Trees 1 Loynachan, Sec. 27, Oriskany 4,027-61 ft., TD 4,078 ft.

Belpre Township: Ohio Fuel Gas Co. 1

THE OIL AND GAS JOURNAL

COST CUTTING COMBINATION

Truco DIAMOND BITS

D&S CORE BARRELS

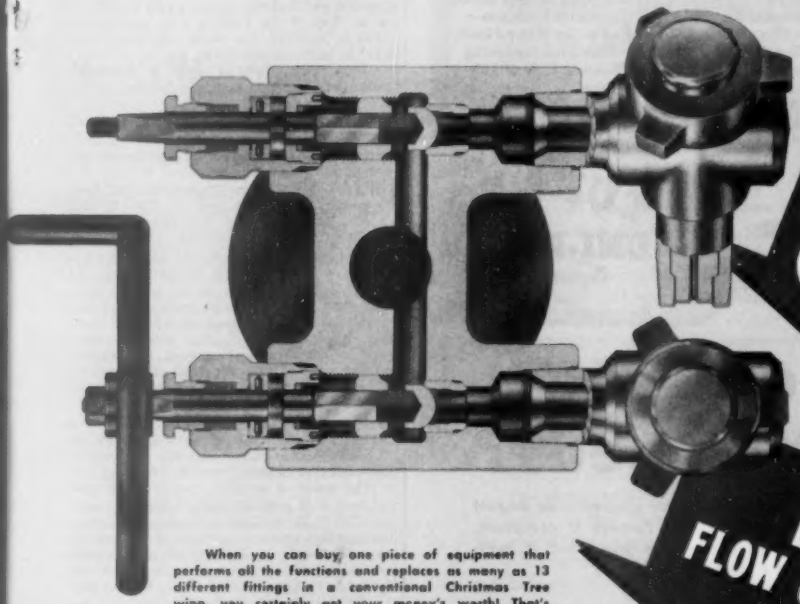
Drilling & Service

3031 Elm Street Dallas 1, Texas

OFFICE PHONE: Riverside-6811
NIGHT NUMBERS: TRemont-5559, Victor-3708

Other Offices - Services	Tyler, Texas 2-2742	Shreveport, La. 5-5474
	Odessa, Texas 6-6774	Casper, Wyo. 3739
	Abilene, Texas 2-2790	Carmi, Ill. 7799
	Victoria, Texas 3264	Ft. Morgan, Colo. 1143
	Norman, Okla. 4360	Great Bend, Kans. ..7995
Distributors	Diamond Drilling Co., 2759 E. Willow St., Long Beach, Calif., Telephone: Long Beach 40-7949	
	Allied Services, Inc., Mt. Pleasant, Michigan Telephone: 29-861	
Foreign	D. T. O'Connor, 500 Fifth Avenue, New York, N. Y.	
	Petroleum Industry Consultants, C. A., Caracas, Venez.	
	Denton - Spencer Co., Ltd., Calgary, Alberta, Canada.	

Saves as much as $700.00* *on every well head assembly!*



The New O·C·T DUAL FLOW CONTROL

When you can buy one piece of equipment that performs all the functions and replaces as many as 13 different fittings in a conventional Christmas Tree wing, you certainly get your money's worth! That's one of the outstanding features of the new O-C-T Dual Flow Control. Besides, it reduces weight as much as 85%, effects savings up to $700.00* when used to replace a 10,000 lb. test conventional double wing, provides a more flexible choice of chokes than any other dual assembly and the proven JE Flow Control floating gate design makes it operate easily even at extremely high pressures.

Take advantage of this newest development by O-C-T, the industry's leader in dependable production equipment. Write for details or ask your nearest O-C-T Representative. Available through supply stores.

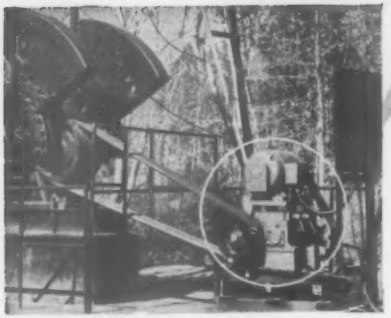
Oil Center Tool Co.

P. O. Box 3091 Houston, Texas

Export Representatives, Sterling Areas — Le Grand, Sutcliff & Gell Ltd., Rochester, Kent, England. Address Export Inquiries for All Other Countries to P. O. Box 3091, Houston 1, Texas.

IT REPLACES 13 DIFFERENT FITTINGS

- ... Reduces cost as much as 300%
- ... Reduces weight as much as 85%
- ... Uses any type positive choke bean
- ... Provides easy operation even at extremely high pressures



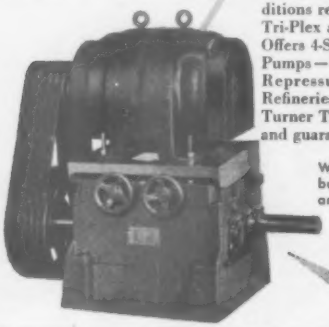
Typical oil field installation on single reduction pumping unit pumping 10, 13, 16 and 19 SPM.

New!

VARY SPMs at the TWIST of a WRIST!

4-SPEED TRANSMISSION 1 THRU 60 H. P. FOR ALL TYPES and SPEEDS of ELECTRIC MOTORS and GAS ENGINES

Consider these applications and problems! Single Reduction Pumping Units—Pump as slow as conditions require—Double Reduction Units too—Tri-Plex and Centrifugal Pumps for Water Flood—Offers 4-Speed Flexibility—Pipe Line Gathering Pumps—Correcting Cold Weather Difficulties—Repressuring Plants—Geared Powers—Refineries—Drilling Rig Accessories—All Turner Transmissions are especially designed and guaranteed for continuous Oil Field Duty.



Write for bulletin 52-A and full details.

TURNER UNI-DRIVE Company

3416 Terrace Street Kansas City 8, Missouri

what are your HOUSING needs?

If it's housing of any description, for domestic or export use, Houston Ready-Cut House Co. can furnish it complete, as you want it, where you want it, when you want it, with extra savings for you in time and cost.

Check off your needs:

- ☐ Employee housing — 1 or 100
- ☐ Office buildings, warehouses or custom structures
- ☐ Planning Service for 1 house or a development
- ☐ Erection service for turnkey jobs

NOW *Phone, wire or write for detailed information on project housing for "package" leasing without capital outlay! There's no obligation.*

PREFABRICATED HOME MANUFACTURERS' INSTITUTE phmi

HOUSTON Ready-Cut HOUSE CO., Inc.

Prefabricated Housing for Industry Since 1917

P. O. BOX 124 HOUSTON 1, TEXAS

Dana Houser, Sec. 8, Oriskany 4,224-53 ft., TD 4,296 ft.

Kansas

Sheridan County Wildcat Opens New Lansing Pool

SOUTHEASTERN Sheridan County, on the western flank of the Central Kansas Uplift in the northern part of the state is getting a new pool where G-M-R Oil Co. is putting its 1 Mills, NW NW NE 17-9s-26w, on the pump following a 4-hour swabbing test in which the well produced an average of 35 bbl. of oil per hour. Production is from the the Lansing-Kansas City section, opposite which casing is perforated at 4,023-34 ft. Top of the Lansing was checked at 3,880 ft. (—1,182 ft.). Hole was drilled to 4,452 ft. in the Mississippian, topped at 4,407 ft. Casing was run to 4,090 ft. Nearest production is in the Southwest Studley field, 3 miles to the north.

Herndon Drilling Co. 1 Chesney, NE NW SE 18-8s-16w, a wildcat north of the Layton pool, 8 miles southeast of Stockton, in eastern Rooks County, produced 60 bbl. of oil in 24 hours during a pumping test for completion from open hole at 3,046-67 ft. in the Lansing-Kansas City lime section, topped at 2,935 ft. (—1,092 ft.).

Swabbing tests at Lindas Oil Co. 1 Kerk-lotz, NW NW SW 5-16-18, northern Rush County wildcat, yielded an average of 2½ bbl. of oil per hour. Total depth is 3,617 ft. in Arbuckle lime, topped at 3,613 ft. and open below 3,613½ ft. The well also had good showings in Gorham sand, just above the Arbuckle with top at 3,601 ft. Location is just south of the Ellis county line and 3 miles from nearest production, the Madden pool, in southern Ellis County.

Possible new oil production is indicated in three Stafford County wildcats. Anschultz Drilling Co. 1 Schultz, NE NE NW 20-23-13, 2 miles north of St. John, got 20 ft. of oil-cut mud in 30 minutes during a drill-stem test at 3,704-13 ft. in Lansing-Kansas City lime. Oil showings also were obtained in a previous test at 3,644-50 ft. Hole is being deepened to the Arbuckle. Eight miles northwest of St. John, Jackson Drilling Co. 1 Sutton, SE SE SW 6-23-14, got 45 ft. of oil-cut mud in a drill-stem test at 3,682-3,702 ft., and 240 ft. of gas and 60 ft. of heavily oil-cut mud in another test at 3,757-76 ft., both in the Lansing-Kansas City lime. Casing has been run for completion with hole deepened to 4,098 ft. in Arbuckle lime, topped at 4,072 ft. M. B. Armer 1 Walters, SW SE SW 36-25s-13w, near Leesburgh, in the extreme southern part of the county, recovered 120 ft. of oil-cut mud in a drill-stem test at 3,821-60 ft. in Lansing-Kansas City lime, and now has casing run to 4,296 ft., 1 ft. in the top of the Arbuckle. Total depth is 4,345 ft. The location is just one 10-acre spot north of the Pratt county line. Lansing was topped at 3,679 ft.

KANSAS SUCCESSFUL WILDCATS

Clark County: Sunray Oil Corp. 1 Harper, SE SE 21-34s-21w, flowed 4.7 M.c.f. of gas with 6 bbl. distillate from Morrow 5,452-60 ft., TD 7,350 ft. PBTD 5,492 ft.

Sedgwick County: J. P. Gaty 1 Bodecker, NE NE NW 25-25s-2e, pumped 25 bbl. of oil from 2,812-18 ft., TD 3,248 ft. PBTD 3,136 ft.

KANSAS WILDCAT FAILURES

Decatur County: Sauvage 1 Foley, SW SE NW 5-1s-27w, dry, TD 3,714 ft.

Ellis County: C. Todd 1 Kuhn, SE SE NW 24-13s-17w, dry, TD 3,654 ft.

Graham County: Anschutz 1 Michaelis, NE NE NE 32-7s-23w, dry, TD 4,180 ft.

Marion County: D. T. Ingling 1 Logan, SE NE NW 29-22s-5e, dry, TD 2,810 ft.

Meade County: Columbian Fuel Oil Co. 1-J Adams, SW SE 6-35s-30w, dry, TD 6,100 ft.

Norton County: Saturn 1 Sullivan, SE SE SW 34-5s-21w, dry, TD 3,697 ft.

Phillips County: The Texas Co. 1 J. Schurz, SE SE SE 8-4s-19w, dry, TD 3,683 ft.

Pratt County: Sohio Petroleum Co. 1 City of Pratt, SW SW SW 17-27s-13w, dry, TD 4,599 ft.

Rooks County: Murfin 1 Williams, SW SW SE 1-8s-18w, dry, TD 3,380 ft.

Trego County: Prime 1 Kirchech, NW NW NE 7-11s-22w, dry, TD 3,943 ft.

Rocky Mountain

Casing Run to Test Eads Area Wildcat

DENVER.—Superior Oil Co. has run casing to test 1 State C SE SE 16-18s-46w, important wildcat in the Eads area of Kiowa County, Colorado. The wildcat, on a block farmed out by Gulf Oil Corp. is along the Las Animas arch, which has had a small series of tests recently. Superior cored saturation in the Marmaton (Pennsylvanian) topped at 4,030 ft. Drill-stem test from 4,049-74 ft. recovered 55 ft. of heavily oil-cut mud, and it is this zone which is to be tested thoroughly. The well went to 5,588 ft., total depth, and casing was landed at 4,250 ft.

A commercial success by Superior would add impetus to interest already shown in the area by several operators. Leasing through the general area along the southeast flank of the Denver-Julesburg basin has recently been active.

In the Denver-Julesburg basin proper two Nebraska wildcats are apparent successes on the basis of current reports. British-American Oil Producing Co. recovered 540 ft. of oil and 800 ft. of water on 1-hour test of the "J" sand at 1 Jacobsen, SE SW NE 27-14n-49w, east of Sidney, Nebraska. The test was of the zone 4,746-53 ft. Later test from 4,750-63 ft. made water, and the operator is drilling below 4,763 ft. Magnolia Petroleum Co. recovered oil in the "D" sand at 1 Eustice, NW NW NW 15-13n-54w for an apparent new pay discovery in Goodwin field, Kimball County. The operator is to complete in the "J" where previous field production is obtained. The test of the "D" sand was of 5,920-27 ft., with a recovery of 270 ft. of free oil, 90 ft. of oil and gas-cut mud, and 450 ft. of water.

Continental Oil Co. has a new discovery in the West Sussex area of Wyoming's Johnson County. The firm's 10 Unit, 1½ mile west of production in Sussex field proper, flowed oil in 30 minutes on test of the Shannon from 2,914-59 ft. The well is west of faulting separating it from the West Sussex area, and will be considered a wildcat discovery.

At West Greybull in Big Horn County, Trigood Oil Co. of Casper has completed 1 Government, NW NE SE 27-52n-94w as a small gas well. The operator has announced no gage. The wildcat went to 12,177 ft.

Man With the Show-How

Although most of our customers fully understand the *functions* of Otis Tubing Safety Valves, Bottom-Hole Chokes and Regulators, and the various Otis Locking Assemblies with which Otis sub-surface tools are landed, many operators are not acquainted with the *design* and *operation* of the equipment. This is understandable, because the critical parts of the average Otis sub-surface control are inside of the cage, mandrel, or nipple. Too, the fact that the tools are downwell equipment prevents actual observation, and further complicates demonstration of the working mechanisms. To overcome this minor adversity, Otis has several kits of quarter- and half-section cutaway models of actual tools which makes the design and operation of the equipment virtually self-explanatory. You can disassemble them, reset the valve springs, check the machining, measure the I.D. and O.D. clearances, inspect the packing...in fact do anything but set them in your oil well. If you would like to examine first-hand a set of Otis sub-surface controls —whether you are using Otis equipment or not—contact your nearest Otis office, or write on your firm's letterhead to Otis in Dallas. Our representative will gladly make arrangements to call on you, and afterwards you'll be better informed on better methods of producing your high-pressure wells.

PRESSURE CONTROL · OTIS · SERVICE · EQUIPMENT

Otis Pressure Control, Inc.

General offices — 6612 Denton Drive; P. O. Box 7206; Tele. Dixon-3911; TWX DL-220; Dallas

Navigation off Hw. 9; Tel. 2-9162; TWX CC-52—Corpus Christi
1919 Kermit Hw.; Tel. 6-3724; TWX Odessa-19—Odessa
East Marshall Hw.; Tel. 1685; TWX LO-46—Longview
1224 No. Washington St.; Tel. 1185—Elk City
P.O. Box 481; Telephone 411—Falfurrias
Oklahoma City—1501 S. E. 29th St.; Tel. Melrose 4-7018; TWX OC-361

New Iberia—1919 East Main St.; Tel. 3280; TWX N. Ib.-66
Houston—2402 Broad St.; Tel. Olive-8523; TWX HO-271
Shreveport—1834 Jenkins St., Telephone 4-6334
Victoria—2412 Rose Drive; Telephone 517
Houma—308 Maple St., Telephone 7135

Authorized export dealer for Otis tools and equipment; Otis Pressure Control Export, Inc. — 6612 Denton Dr., Dallas, Tex., U.S.A.; Apartado 1706, Caracas, Venezuela; 1202 17th Ave. W., Calgary, Alberta, Canada

plugged back for completion in the Greybull sand, topped at 10,330 ft.

Two new wildcats have been announced for the eastern flank of the Williston basin. C. D. Johnson of Wichita Falls, Texas, will drill 1 Rath, C NE NE 30-137n-67w in Stutsman County, North Dakota. Pepper Refining of Oklahoma City has location for a wildcat in Walworth County, South Dakota in C NE SE 36-123n-76e. Both tests will go to granite.

In the Long Lake area of North Dakota's McLean County, Stanolind Oil & Gas Co. has plugged its wildcat in C SW SW 28-150n-80w. Details have not been released, but the wildcat was bottomed at 8,900 ft. without reported shows.

The second well in the Duchesne area of Utah's Uinta County has been completed by Carter Oil Co. and Continental Oil Co. for an estimated initial of 1,730 bbl. of 41.7°-gravity oil per day. It is an offset to the discovery in the area which produced 538 bbl. per day through 1-in. choke from the basal Green River. Test of the new producer was on 45/64-in. choke. Production is from 7,516-7,661 ft. after plug back from total depth of 11,317 ft.

Lowry et al of Albuquerque this week completed the fifth well and biggest producer in Tocito field of northern New Mexico for a flow of 1,743 bbl. per day through ¾-in. choke. The top of Tocito was logged at 6,704 ft. and total depth is 6,761 ft.

KERRIGAN a Great Name in Grating

With the WELD that Never Fails!

Kerrigan grating is a one-piece INSEPARABLE unit. Bearing bars and cross-bars are WELDFORGED by Kerrigan's exclusive process into ONE PIECE. Resulting grating is a strong, anti-slip, easy-to-clean grating that affords maximum light and ventilation, a minimum of installation and maintenance expense, and long years of trouble-free use.

BONDERIZED for rust resistance and extra protection against corrosion! Holds paint to metal for durable finishes.

WRITE FOR CATALOG AND SPECIFICATION SHEETS;

and for a copy of "A PICTURE STORY OF KERRIGAN" which shows how KERRIGAN Weldforged steel grating is custom engineered . . . and how Kerrigan's Never-Fail Weld stands up under the severest kind of punishment. Just write on your letterhead for free copy.

Weldforged GRATING DIVISION

KERRIGAN IRON WORKS, INC.

NASHVILLE, TENNESSEE

GENERAL SALES OFFICE, 274 MADISON AVE., N.Y.C.

MID-WEST SALES OFFICE, 2725 W. PETERSON AVE., CHICAGO

WYOMING WILDCAT FAILURE

Fremont County, East Muskrat: Empire State 2 State, C NE NW 16-33n-91w, dry TD 6,609 ft. Tensleep 6,495 ft.

COLORADO WILDCAT FAILURES

Logan County: Sinclair Oil & Gas Co. 1 State, SW NE SW 22-10n-54w, dry, TD 5,540 ft. Dakota 5,409 ft.

Sinclair Oil & Gas Co. 1 Marsh, NE SW SE 22-12n-53w, dry, TD 5,800 ft. Dakota 5,586 ft.

Sedgwick County: Stanolind Oil & Gas Co. 1 E. Price, W½ NW SW 35-11n-47w, dry, TD 3,882 ft. Dakota 3,809 ft.

Weld County: Husky Oil Co. 1 Rauth, SW SW NE 13-9n-58w, dry, TD 6,239 ft. "D" sand 6,122 ft.

NORTHERN NEW MEXICO WILDCAT FAILURE

Rio Arriba County: Stanolind Oil & Gas Co. 1 Jicarilla Apache, NW SE NE 22-32n-3w, dry, TD 1,920 ft. Pictured Cliffs 1,815 ft.

Central Area

MICHIGAN

Tests were being run this week in the Salina at Carter Oil Co. 12 Lauber, C SE SE 6-16n-17w, Weare Township, Oceana County, a deeper horizon test in Pentwater field, after a blow-out in the Salina gassed and hospitalized three members of the drilling crew. Well was being drilled in salt at 3,697 ft. when the blow-out showed. The well was being drilled with 10.6 to 10.8-lb. mud at the time that the gas showed at the surface. Hole was loaded with 12.7-lb. mud, pressure was released, reported at 750 psi. on casing, with back-pressure on drill-pipe after being shut in. Logs showed that well was in salt at the time, but it is believed that a dolomite zone may have only been scratched and did not show on the logs. First attempted drill-stem test, with packer set at 3,600 ft., appeared to have been a failure, although gas showed immediately at the surface when tool was opened. Another drill-stem test was in progress. This deeper horizon wildcat, scheduled to test out the St. Peter at about 5,500 ft., is located approximately 12-15 miles south by southeast of a well being drilled by Dow Chemical Co. in Hamlin Township, Mason County, which showed a big gas pay in the basal Salina, but the Pentwater wildcat is believed to be at a shallower horizon in the Salina than the Dow well. It was expected that Carter would start diamond coring operations at the 12 Lauber as soon as satisfactory testing is complete at its present depth. Pentwater field, in which this well is located, is producing from the shallower Traverse and Dundee oil pays.

EASTERN KENTUCKY

After establishing commercial production in Letcher County as a southern extension to Big Sandy gas field, Kentucky West Virginia Gas Co. are drilling two more wells in this new area. The 6068 L. D. Collins is making hole below 1,380 ft. while 6066 William Sexton is building road into location.

In Elliott County and on the Sandy Hook anticline, Herchenroeder et al are deepening 1 Ison and Green. This wildcat, on Ruin Creek, topped Corniferous lime at 1,292 ft. and at total depth of 1,303 ft. had settled production of about 2 bbl. of oil daily. Oper-

"Hose Downtime?_Not On This Rig..."

These NYB&P Flexible Units
Speed Rig-up and Tear-down Time

Here are the advantages of these time-proved units:

Save time in rig-up and tear-down and shut-down due to failure . . . compensate for misalignments . . . absorb destructive vibration . . . prevent hazardous air intake . . . reduce pressure losses inherent with sharp angle fittings.

- Green Triangle Discharge Hose
- Great Seal Utility Hose
- Green Triangle Suction Hose
- Built-in Fittings

GREEN TRIANGLE
3-Band Rotary Hose
by
New York Belting & Packing Co.

Balanced 4-wire construction provides:

STRENGTH — to resist today's high drilling pressures.

FLEXIBILITY — for all types of rigs.

DURABILITY — maximum footage at minimum cost per foot drilled.

CONTINENTAL

SERVING THE OIL AND GAS INDUSTRIES

THE CONTINENTAL SUPPLY COMPANY, *General Offices:* DALLAS, TEXAS
Export Division: The Continental Supply Co., Inc., 30 Rockefeller Plaza, New York, N. Y.
The Continental Supply Co., 134-135 Salisbury House, London Wall, London E.C.2, England
The Continental Supply Company, Limited, 216 Lancaster Building, Calgary, Alberta

Representatives: ARGENTINA • BOLIVIA • BRAZIL • CHILE • COLOMBIA • ECUADOR • PERU • TRINIDAD • URUGUAY • VENEZUELA

GO DEEPER

"CHEAPER"

WITH B & B PREFORMED

Yellow Strand

ROTARY LINES

Yellow Strand Rotary Lines have been proved on the toughest oil field jobs. They've helped put down holes faster, farther, and at lower cost.

Yellow Strand is engineered to maintain its original rugged construction, there's no excessive stretching as heavier tools go deeper.

Yellow Strand's individual wires are of specification-steel to give higher resistance to abrasion.

Yellow Strand is sold by Continental. Delivery is quick and supplies are backed by Broderick & Bascom's four factories and eight warehouses. Call your Continental representative for a Pre-formed Yellow Strand line to take you deeper, cheaper!

CONTINENTAL

SERVING THE OIL AND GAS INDUSTRIES

THE CONTINENTAL SUPPLY COMPANY, General Offices: DALLAS, TEXAS

Export Division: The Continental Supply Co., Inc., 30 Rockefeller Plaza, New York, N. Y.

The Continental Supply Co., 134-135 Salisbury House, London Wall, London E.C.2, England

The Continental Supply Company, Limited, 216 Lancaster Building, Calgary, Alberta

Representatives: ARGENTINA • BOLIVIA • BRAZIL • CHILE • COLOMBIA • ECUADOR • PERU • TRINIDAD • URUGUAY • VENEZUELA

ators are deepening to try and increase production from lower levels.

WESTERN KENTUCKY

George S. Engle is putting his 1 Flack, a wildcat in 13-Q-20, in the northwestern tip of Henderson County, on the pump following swabbing tests which yielded 41 bbl. of oil in 17 hours after acidizing. Pay zone is O'Hara lime, opposite which casing is perforated at 2,634-51 ft. Total depth is 2,783 ft. in McClosky lime. The area is about 1½ miles east of the Powells Lake pool, across the line in Union County. It is 4 miles south of Mount Vernon, Indiana.

In southwestern McLean County, near the Hopkins County line, H. E. Lopp and Thurston Cook have completed their 1 Ellis, 9-L-26, pumping 98 bbl. of oil per day from O'Hara lime at 2,638-44 ft. in open hole below 2,633 ft. The well opens a new pool, 2 miles from other production. Location is 7 miles southwest of Calhoun.

A ¾-mile extension of production in the Sebree area on the Webster-Henderson County line is in prospect where W. F. Lacy and George & Wrather have run oil string to test good saturation found in O'Hara lime at their 1 Roma Melton, NE NE SW 9-N-24. Two drill-stem tests were made, one at 2,446-61 ft. and the other at 2,461-72 ft. The first got gas in 6 minutes and filled 1,980 ft. with clean oil, 180 ft. with gas and mud-cut oil, and 50 ft. with salty oil and gas-cut mud. The other got gas in 3 minutes and recovered 380 ft. of clean oil and 100 ft. of oil-cut mud with 80 ft. of water. Eact test was open 60 minutes. Casing was run through the pay in hole drilled to 2,555 ft. The location is just south of the Henderson County line in Webster County, and 2 miles north of the town of Sebree.

First McClosky production for the area 3 miles southwest of Smith Mills in western Henderson County is being opened by William E. Styles at his 1 S. E. Sowards. The well, located in 15-P-21, is a former producer from Tar Springs sand, main pay zone of the area. Deepened to 2,690 ft., it found good saturation in McClosky lime at 2,670-90 ft., where, during a drill-stem test, it got gas in 3½ minutes and started flowing oil in 22 minutes. There was no indication of water. Bottom-hole pressure registered 900 psi. Operators ran 5½-in. oil string to the top of the new pay, and now are preparing for production tests.

ILLINOIS

Lawrence County is getting another producing area, located 2 miles southeast of Lawrenceville, where Walter Duncan and Hayes Drilling Co. are testing their 1 David, SW SW SE 8-3n-11w. Initial swabbing tests before acidizing yielded 40 bbl. of oil with 2 bbl. of water per day. Production is from Cypress sand at a total depth of 1,608 ft. with bottom of the oil string at 1,594 ft. Saturation was logged at 1,592-1,600 ft. and 1,603-06 ft.

Goodman Oil Co. 1 Smothers, NE NE NW 17-3s-9e, a step-out test on the west side of the Goldengate Consolidated field in Wayne County, got 1,800 ft. of gas and 120 ft. of oil-cut mud in 60 minutes during a drill-stem test at 3,339-57 ft. in the Aux Vases zone. Operators are drilling ahead for a look at lower formations.

George & Wrather 1 Corcoran, SW SE SW 29-4s-10e, a wildcat in the East Sumpter area, White County, got some oil with water in swabbing tests of Benoist sand at 2,921-34 ft., and at latest report had plugged back to 2,815 ft. and was preparing to test oil showings encountered in Cypress sand at 2,794-2,810 ft., opposite which an alloy section had been run in the casing string. Location is ¾ mile northeast of an Aux Vases discovery well completed earlier in the year.

INDIANA

Opening a new Waltersburg sand pool in western Spencer County, Nash Redwine has completed his 1 Walter Sparks, SE SE SW 13-6s-7w, making 63 bbl. of oil per day on the pump. Pay is at 900-913 ft. in open hole below 899 ft. Location is south of Midway and 3 miles northeast of Richland. It is 2 miles from nearest production.

A new Aux Vases producing area also has been opened in Gibson County, where Coy Oil Co. 1 Huey, Survey 7-1s-10w, pumped 210 bbl. of oil per day on completion tests. Pay is in a sandy lime zone at 1,852-60 ft. in open hole below 1,830 ft. Total depth is 1,965 ft. Location is 5½ miles north of Princeton and about a mile from other production in the general area. A west offset, 1 Willard Kolb, is drilling.

L. F. Wilson and Joe Vail 1 Fawcett, NE SW NE 34-6s-12w, ¾ mile southeast of production in the Ford South pool, eastern Posey County, pumped 82 bbl. of oil without any water while completing in McClosky lime at 2,728-34 ft. The area is 7 miles west of Evansville.

MICHIGAN WILDCAT FAILURES

Newaygo County, Goodwell Township: Union Development Co. 1 Konitzer, SE SW NW 34-14n-11w, Traverse 2,789 ft., dry, TD 2,808 ft.

Osceola County, LeRoy Township: Sun Oil Co. 1 Carlson et al, SW NW NW 34-19n-10w, Dundee 3,698 ft., dry, TD 3,896 ft.

Ottawa County, Zeeland Township: Traverse

FIRST
IN CANADA'S
OIL FIELDS
Branches throughout Canada's oil-rich western plains. On-the-spot information available through J. C. Mayne, Supervisor, Calgary, Alberta, or Head Office, Montreal
Assets exceed $2,500,000,000
THE ROYAL BANK OF CANADA
Over 760 branches in Canada and abroad

FOUNDRY SERVICE

FOR THE OIL INDUSTRY

Pouring steel castings at AVONDALE'S Foundry Division

The top quality of SERVICE FOUNDRY work has become famous in the Oil industry.
Expert metallurgical control insures uniformity of quality in casting; expert workmanship in gear cutting and in our machine shop; expert handling throughout the entire SERVICE FOUNDRY operation — from office force to delivery has made our name what it is today!

service foundry — a division of
416 Erato Street, New Orleans 13

avondale marine ways, inc.
P.O. Box 1030, New Orleans 8

B and W SCRATCHERS AND CENTRALIZERS FOR A *Good* CEMENT JOB

B and W LATCH-ON CENTRALIZER
With the NEW KON-KAVE BOW. Drop forged from the finest alloy spring steel.

B and W MULTI-FLEX SCRATCHER
Scratches on the upstroke after casing reaches bottom.

B and W HINGED NU-COIL SCRATCHER
The coil spring, reversible scratcher. Economical and easiest to install.

B and W ROTATING SCRATCHER
Covers the critical section — rotate until the cement is placed.

GULF COAST
P. O. Box 5266
Houston 12, Texas
WEstworth 6603

B and W Incorporated
Well Completion Specialists

WEST COAST
3545 Cedar Avenue
Long Beach 7, Calif.
Long Beach 4-8266

Are your **OIL INVESTMENTS**
Closely Held or Family Owned?

We specialize in the making of oil loans and advising on the financial problems of independently owned oil and gas producing properties.

C. LESLIE RICE
Vice President

J. F. DOUGHERTY
Vice President

Oil Department

Empire Trust Company
7 WEST 51st STREET
at Rockefeller Center, New York, N. Y.

Oil Producers 1 DeHaan, SE NW SE 33-5n-14w, Traverse 1,528 ft., dry, TD 1,551 ft.

Van Buren County, Columbia Township: Norman L. Stevens 1 Grimes, NE SW NE 19-1s-15w, Traverse 1,131 ft., dry, TD 1,140 ft.

WESTERN KENTUCKY WILDCAT FAILURES

Hancock County: Henry Scholl 1 Payne, 15-P-33, dry, TD 1,025 ft.

Great Lakes Carbon Co. 1 Glover, 23-Q-33, dry, TD 1,065 ft.

Henderson County: B. M. Heath 1 Pritchett, 9-O-22, dry, TD 2,712 ft.

Hopkins County: Basin Drilling Co. 1 Rudd, 8-K-25, dry, TD 2,991 ft.

ILLINOIS WILDCAT FAILURES

Clay County: J. N. Hockman 1 Crackel-Vickery, NE SE SE 17-4n-8e, dry, TD 3,107 ft.

Clinton County: Perry Fulk 1 Orphans Home, NW SE NE 27-3n-4w, dry, TD 2,350 ft.

Fayette County: Stanford Oil Co. 1 Hoppe et al, SW SW SE 35-5n-1e, dry, TD 1,676 ft.

Jasper County: Mervin & Steber 1 Ousler, NW SE SW 1-5n-9e, dry, TD 3,086 ft.

H. H. Ringger 1 Baker, NW NE NE 28-8n-14w, dry, TD 1,046 ft.

Madison County: Kingwood Oil Co. 1 Castor, SE SE NE 22-4n-7w, dry, TD 2,316 ft.

Randolph County: Ralph Halbert 1 Ross, NW SW NE 33-5s-6w, dry, TD 1,972 ft.

Aubrey-Tennant 1 Baird, SW SE SE 2-5s-5w, dry, TD 2,480 ft.

Wabash County: Hayes Drilling Co. 1 Knowles-Smith, SE NE NW 25-1n-13w, dry, TD 2,498 ft.

Wayne County: A. J. Slagter 1 Thomason, SE SW SE 32-2s-6e, dry, TD 3,422 ft.

Stanford Oil Co. 1 Mathews, NW SW SW 30-1s-6e, dry, TD 3,216 ft.

White County: E. F. Moran 1 Kech heirs, SW SW SW 31-6s-11e, dry, TD 3,036 ft.

Fred Hinkle 1 Douglas, NE NE SE 31-6s-8e, dry, TD 3,096 ft.

Ryan & Sharp 1 Jordan, SW NE NE 21-5s-8e, dry, TD 3,502 ft.

INDIANA WILDCAT FAILURES

Gibson County: E. F. Moran 1 Knowles, NE SE NW 33-3s-12w, dry, TD 2,786 ft.

Martin County: Max Toliver 1 Dye, SW NE SW NE 32-4n-3w, dry, TD 700 ft.

Pike County: P. L. Pitzer 1 Cottrell, SE SW SW 18-1s-8w, dry, TD 1,578 ft.

Stanford Oil Co. 1 Davidson, SE SW SW 7-1n-9w, dry, TD 3,255 ft.

Charles Bury 1 Horrell, SE SW NW 34-1n-8w, dry, TD 1,489 ft.

Posey County: Barron Kidd 1 Mills, NW SE SW 15-5s-13w, dry, TD 2,999 ft.

Sullivan County: C. L. Turner 1 Irvin-Kirkman, NE SW SW 18-7n-8w, dry, TD 1,644 ft.

Vanderburgh County: Calvert Drilling, Inc., 1 Schemick, SW SW SW 11-6s-11w, dry, TD 1,130 ft.

LEGAL

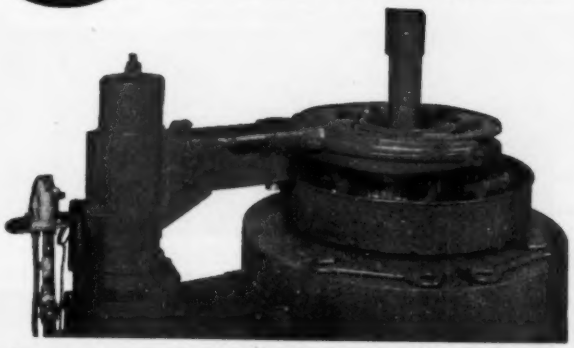
U. S. DEPARTMENT OF THE INTERIOR, BUREAU OF LAND MANAGEMENT, Washington 25, D. C. Notice is hereby given that two parcels of land in T. 20 S., R. 34 E., N.M.P.M., New Mexico, containing approximately 160 acres, within the known geologic structure of the Lynch field, will be offered for oil and gas leasing through competitive bidding to the qualified bidder of the highest cash amount per acre at 1 p. m., Eastern Standard Time, July 2, 1952, when bids will be opened. The details of the lease offering and how and where to file bids may be obtained by addressing an inquiry to the Manager of the Land and Survey Office, Santa Fe, New Mexico, or to this office. Marion Clawson, Director.

"I don't care what the boys at the well told you—tools for a fishing job do not include a pole and bait."

KELCO

For Safety Unsurpassed

AIR OPERATED POWER SLIPS



Six years of complete field satisfaction with major companies and drilling contractors.

Available through your favorite supply stores.

Be Safety Wise — KelCo-ize

Representatives in all principal oil fields

KELCO BEN F. KELLEY CO., Inc.
TULSA, OKLAHOMA

SPINNING LINE CATHEADS • BREAKOUT CATHEADS • AIR OPERATED POWER SLIPS
TUBING TONGS • SAFETY "C" POLISHED ROD CLAMPS

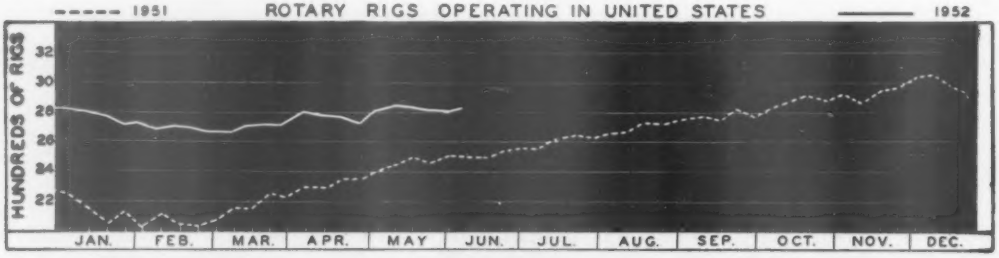
CURRENT STATISTICS

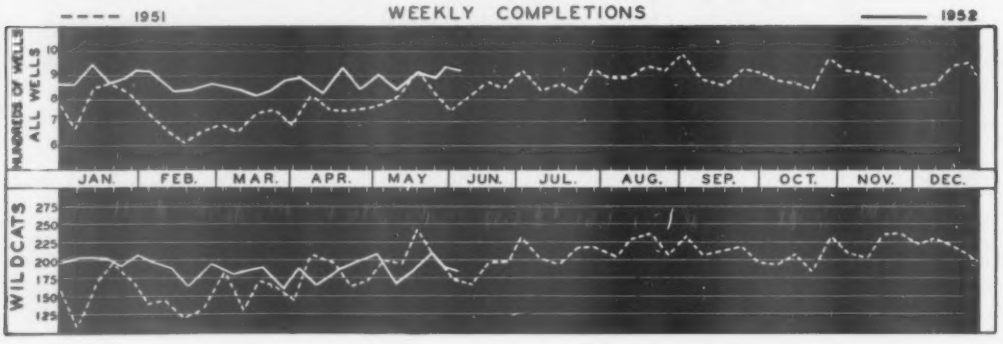
EXPLORATION

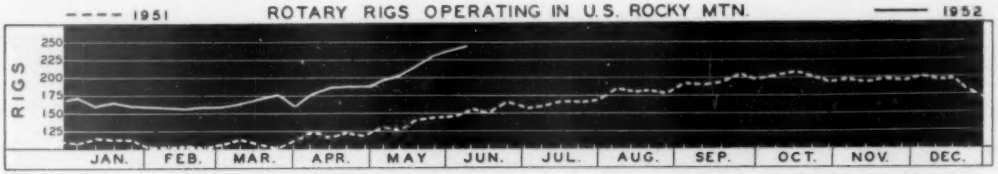
WEEKLY WELL COMPLETIONS . . . WEEK ENDED JUNE 7, 1952

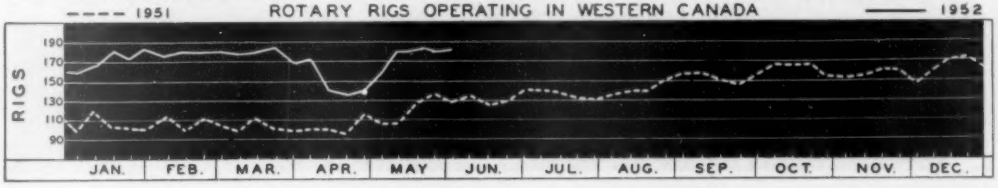
	Total of all wells					June 7		Wildcat completions and discoveries					Cumulative total, 1952				
	Comp.	Oil	Gas	Dry	Footage	1952	1951	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	20	10	0	*10	24,000	306	237	0	0	0	0	0	0	0	0	0	0
Pennsylvania	32	14	5	†13	64,000	725	618	0	0	0	0	0	0	0	0	2	2
West Virginia	6	1	0	5	20,588	275	255	0	0	0	0	0	0	0	2	2	4
Ohio	19	9	5	‡5	40,015	400	355	0	0	0	2	2	0	0	6	7	13
Indiana	34	15	0	19	56,756	477	417	0	0	0	8	8	14	0	2	141	157
Kentucky	25	10	5	10	47,044	562	437	0	0	0	4	4	9	0	0	97	106
Illinois	38	12	0	26	100,715	664	896	0	0	0	14	14	7	0	0	180	187
Michigan	11	5	0	6	30,484	304	287	0	0	0	4	4	14	0	2	105	121
Kansas	81	30	10	‡41	270,704	2,078	1,819	1	0	1	10	12	43	0	7	338	388
Nebraska	0	0	0	0	0	100	111	0	0	0	0	0	4	0	0	54	58
Oklahoma	116	71	3	42	503,672	2,622	2,433	5	0	0	9	14	50	1	7	271	329
Texas	363	203	10	150	1,814,888	7,894	7,121	16	0	0	75	91	363	32	54	1,644	2,093
North Central (Dist. 7-B & 9)	119	58	1	60	424,134	2,469	2,171	10	0	0	29	39	207	1	19	690	917
West (Dist. 7-C & 8)	137	103	1	33	793,899	2,469	2,165	2	0	0	18	20	66	0	3	290	359
Panhandle (Dist. 10)	4	2	1	1	18,622	291	301	0	0	0	1	1	1	0	3	22	26
Eastern (Dist. 5 & 6)	13	9	1	3	63,343	411	528	2	0	0	1	3	14	3	0	95	112
Gulf Coast (Dist. 2 & 3)	41	16	2	23	281,732	1,171	991	0	0	0	9	9	45	19	13	237	314
Southwest (Dist. 1 & 4)	49	15	4	30	233,158	1,083	965	2	0	0	17	19	30	9	16	310	365
Louisiana	47	25	7	15	360,395	977	846	1	0	0	7	8	18	9	5	109	141
Northern	20	8	6	6	74,219	510	418	0	0	0	2	2	7	0	5	47	59
Southern	27	17	1	9	286,176	467	428	1	0	0	5	6	11	9	0	62	82
Arkansas	5	2	0	3	18,563	160	152	0	0	0	1	1	4	0	0	25	29
Mississippi	6	0	0	6	37,422	163	123	0	0	0	3	3	8	1	1	65	75
Southeastern States	2	0	0	2	11,995	25	29	0	0	0	2	2	1	0	1	14	16
Montana	7	7	0	0	17,229	105	70	0	0	0	0	0	2	0	1	21	24
Wyoming	12	10	0	2	67,365	296	266	0	0	0	1	1	13	0	2	46	61
Colorado-Utah	7	1	0	6	41,417	212	99	0	0	0	4	4	11	0	6	76	93
New Mexico	27	18	4	5	151,256	441	282	0	1	0	3	4	17	2	1	43	63
California	42	25	1	16	188,209	1,101	936	0	0	1	10	11	40	0	2	208	250
North Dakota	1	1	0	0	8,603	18	2	0	0	0	0	0	3	0	0	4	7
Miscellaneous (Mo.)	6	0	2	4	4,119	35	33	0	0	0	2	2	0	0	10	13	23
Total United States	907	469	52	386	3,879,439	19,940	17,824	23	1	2	159	185	621	45	109	3,465	4,240
Total previous week	935	489	59	387	3,965,478	....	....	19	4	5	163	191	598	44	107	3,306	4,055
Total June 9, 1951	802	420	48	334	3,202,065	....	....	20	2	1	144	167	603	34	113	3,133	3,883

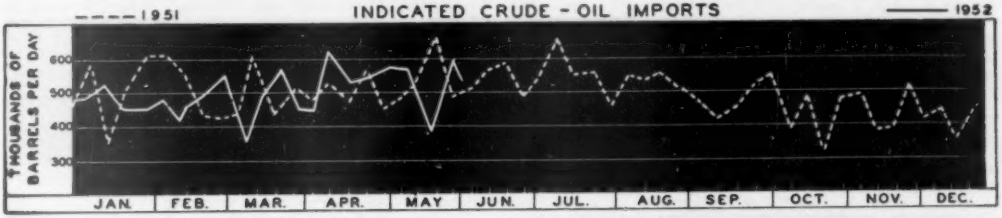
Service wells included: *10, †11, ‡1.







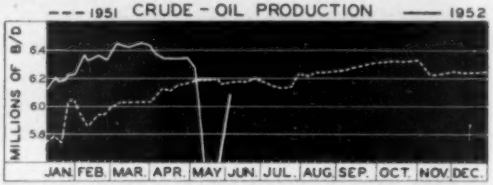


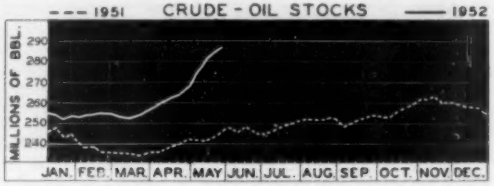


DAILY AVERAGE PRODUCTION FOR WEEK

	June 7, 1952			May 31
	Crude oil	Lease condensate	Total	total
Alabama	2,700	.....	2,700	2,800
Arkansas	76,500	4,100	80,600	80,700
California	987,500	.....	987,500	978,300
Colorado	77,900	.....	77,900	72,500
Eastern	58,500	.....	58,500	58,000
Florida	1,750	.....	1,750	1,750
Illinois	168,900	.....	168,900	161,200
Indiana	32,300	.....	32,300	32,800
Kansas	248,700	.....	248,700	171,150
Kentucky	33,900	.....	33,900	34,000
Louisiana	628,400	37,650	666,050	.....
North	111,900	13,200	125,100	124,750
South	516,500	24,450	540,950	.....
Michigan	36,600	.....	36,600	36,900
Mississippi	93,150	4,100	97,250	97,150
Montana	27,200	.....	27,200	27,000
Nebraska	6,000	.....	6,000	5,800
New Mexico	164,375	425	164,800	.....
Oklahoma	526,300	.....	526,300	482,500
Texas	2,655,650	43,000	2,698,650	.....
Dist. 1	31,625	125	31,750	.....
Dist. 2	143,725	3,850	147,575	.....
Dist. 3	437,100	24,250	461,350	.....
Dist. 4	236,800	4,400	241,200	.....
Dist. 5	54,075	250	54,325	.....
Dist. 6	115,375	4,400	19,775	.....
East Texas field	270,000	.....	270,000	.....
Dist. 7-B	92,450	75	92,525	.....
Dist. 7-C	132,375	5,075	137,450	.....
Dist. 8	896,850	200	897,050	.....
Dist. 9	162,700	375	163,075	.....
Dist. 10	82,575	.....	82,575	.....
Utah	4,000	.....	4,000	2,000
Wyoming	185,000	.....	185,000	155,000
North Dakota	1,800	.....	1,800	1,600
Total U. S.	6,017,125	89,275	6,106,400	.....
Canada	147,660	.....	147,660	200,100

Cumulative figures to be resumed when complete totals for strike period are available. Texas, S. La. and N. M. May 31 totals are incomplete.



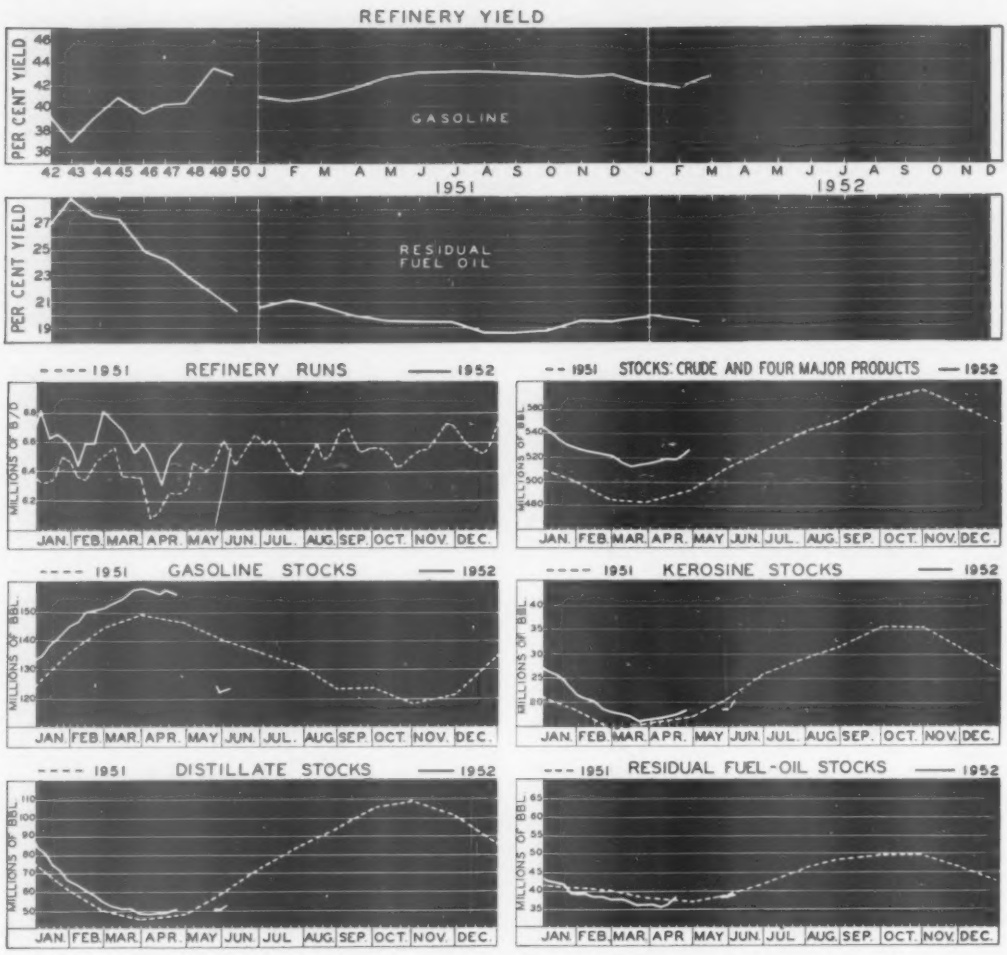


CRUDE-OIL STOCKS BY STATES OF ORIGIN*

(Thousands of barrels)

	May 31, '52	May 24, '52	June 2, '51
Pennsylvania Grade	2,538	2,445	2,039
Other Appalachian	2,043	2,056	1,530
Illinois, Indiana, Michigan	13,239	12,486	11,223
Arkansas	3,217	3,192	2,767
Louisiana	16,168	15,941	14,626
North	2,965	2,931	3,008
Gulf	13,203	13,010	11,618
Mississippi	3,651	3,763	3,197
New Mexico	7,549	7,504	6,779
Oklahoma and Kansas	42,892	43,777	37,986
Texas	141,630	140,798	116,086
East Texas proper	14,293	13,791	(†)
West Texas	60,459	61,575	(†)
Texas Gulf	33,308	31,625	(†)
Other Texas	33,570	33,807	(†)
Rocky Mountain	16,031	15,134	14,153
California	30,438	30,281	30,234
Foreign	8,630	8,436	7,547
Total	288,026	285,813	248,167

*Bureau of Mines. †Not comparable with current week.

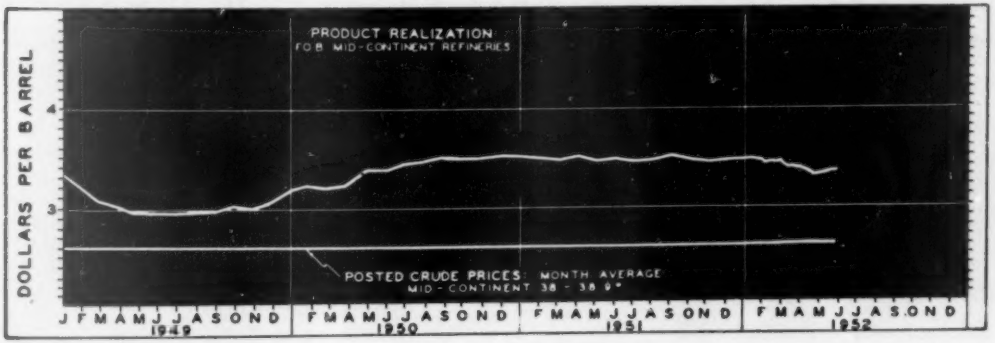


A.P.I. REFINERY REPORT, JUNE 7

(Thousands of barrels)

District—	Daily avg. runs	Daily average production—Gaso.*	Kero.	Dist.	Resid.	Stocks‡—Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, June 1951—Daily avg. runs	Daily average production—Gaso.*	Kero.	Dist.	Resid.
East Coast	1,110	438.0	40.8	258.0	239.1	29,124	8,510	16,391	11,091	1,042	404.4	45.2	225.7	242.9
Appalachian:														
District 1	107	52.0	4.0	12.4	13.4	3,461	423	799	630	106	49.9	6.5	13.3	9.6
District 2	65	28.0	2.7	8.9	12.3	1,653	214	321	189	76	36.9	4.4	8.6	17.1
Ind., Ill., Ky.	1,293	656.0	66.4	235.0	164.0	25,916	3,690	9,898	4,725	1,210	634.3	64.2	193.7	156.7
Okla., Kans., Mo.	489	280.0	10.9	103.9	42.9	12,507	1,182	8,194	1,460	546	290.0	18.6	123.7	66.7
Inland Texas	272	179.6	12.0	41.1	46.9	4,387	432	1,282	943	257	160.2	12.4	39.5	44.1
Texas Gulf Coast	1,426	639.3	112.7	377.6	226.1	17,297	2,887	5,638	5,099	1,567	707.9	113.6	330.7	248.9
La. Gulf Coast	547	246.8	45.3	129.0	55.9	5,988	1,841	2,127	1,656	500	242.3	38.8	126.4	65.2
N. La. and Ark.	77	30.9	6.1	23.0	6.4	2,680	549	1,028	203	76	29.6	6.4	17.5	7.7
Rocky Mountain:														
New Mexico	19	10.7	.....	2.3	4.0	125	.....	52	33	14	7.5	0.2	2.7	3.3
Other Rocky Mtn.	277	102.0	6.3	47.3	44.6	4,584	329	1,335	1,141	237	108.9	4.0	45.3	46.7
California	966	439.0	7.9	133.8	338.0	15,734	325	6,603	11,918	944	428.2	12.9	126.7	367.9
June 7, 1952	6,598	3,102.3	315.1	1,372.3	1,193.6	123,456	20,382	53,668	39,088	6,575	3,101.1	327.2	1,253.8	1,276.8
May 31, 1952	5,573	2,535.9	258.9	1,082.6	1,121.6	122,161	19,050	50,966	38,523	.....	.....	.....	.....	.....
June 9, 1951	6,478	3,032.4	331.4	1,239.7	1,274.4	138,736	23,725	61,476	39,765	.....	.....	.....	.....	.....

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit and in pipe lines.


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
DOLLARS PER BARREL
4
3
POSTED CRUDE PRICES: MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
J F M A M J J A S O N D
1949
F M A M J J A S O N D
1950
F M A M J J A S O N D
1951
F M A M J J A S O N D
1952

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil. Realization averaged $3.33 for week ended May 31, $3.34 for previous week, and $3.47 for May 1951. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of June 11, 1952. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10⅜-10½	12-12.75	10¼-11
Premium gasoline, 86-88 octane	11⅜-11½	13.5-13.75	11¾-12
42-44 w.w. kerosine	8¾-9	10-10.1	9
No. 2 straw fuel oil	7¾-8	9-9.25	8
No. 6 residual	$1.25-1.35	$2.45-2.60	$1.75-1.90

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5½	5	5¼
Grade 18-55	6.6	6.1	6.35

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13-13.5
750 vis., No. 3-4 neutral	16
2,000 No. 5-6 neutral	18-19

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	29
200 vis., No. 3 neutral, 0-10 pp.	16.5

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	32.5
180 vis., 0 p.t. neutral	31.5

WAX

Mid-Continent

132-134 A.M.P.	5.5

THE steel strike is putting additional pressure on the heavy-fuel market in District 2 and is causing some easing in Districts 1 and 3.

Residual fuel is reported to be readily available on the East Coast at the low of the market with some material offered for resale at prices under the low. The softening market represents the combined effect resulting from a normal seasonal decrease in demand, the loss of sales to steel mills that are closed by the strike, and some decrease in general industrial activity where it is related to steel production.

In District 2 heavy-fuel markets were soft even during the refinery strike period. The steel strike has cut residual demand enough to cause lower quotations. Prices are generally quoted at about $1.25 a barrel, but material is available to resellers at prices reported to be as low as $1.00. Most sales to railroads are at about $1.30, but railroad fuel normally does not move at the lowest price on a soft market nor at the top price in a tight market.

The loss of production during the refinery strike period is estimated at about 2.5 per cent of the annual output at refineries. Since refinery operations must be boosted about 5 per cent to cover increases in demand, the additional load resulting from the loss of production during the strike period will make it necessary to run the crude that would be required to meet a demand increase of about 7.5 per cent.

Gasoline prices are firm on all markets in the country. However, there has been some easing from the mad scramble for material in the last half of May. Most suppliers expect gasoline markets to range from firm to tight through September.

Some marketers of home heating fuel are expressing concern over the possibility that refiners may increase gasoline yields to the point where distillate stocks may be low at the start of the heating season.

CRUDE PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif.‡	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.93	....	....	....
19-19.9	1.98	....	....	....
20-20.9	2.03	$2.25	....	$2.12
21-21.9	2.07	2.27	....	2.14
22-22.9	2.12	2.29	....	2.16
23-23.9	2.18	2.31	....	2.18
24-24.9	2.24	2.33	$2.56	2.20
25-25.9	2.30	2.35	2.58	2.22
26-26.9	2.36	2.37	2.60	2.24
27-27.9	2.41	2.39	2.62	2.26
28-28.9	2.46	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.57	2.45	2.68	2.32
31-31.9	2.62	2.47	2.70	2.34
32-32.9	2.68	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel.	
Kettleman Hills, California*	$2.80
Louisiana:	
Beauregard Parish	2.60
Cotton Valley (distillate)	2.85
Cotton Valley (crude)	2.70
Texas:	
East Texas	2.65
Pecos County (Yates)	2.35
Conroe	2.83
Van	2.48
Pennsylvania Grade:	
Bradford	4.25
Southwest Pennsylvania	3.82
West Virginia	3.76
Illinois Basin	2.77

*37°-37.9°.

EQUIPMENT MEN . . . in the News

Organizational Changes Announced by Byron Jackson

B. A. HILLIARD

W. C. BROOKS

Sales of the Oil Tool Division and PB Division of Byron Jackson Co. have been combined under the supervision of Ben A. Hilliard, sales manager of

C. F. VINCENT

J. P. MAGOFFIN

Oil Tool Division, according to an announcement by Floyd Merritt, vice president.

Hilliard will direct the sales program for the two divisions, and will be assisted by the following regional managers: W. C. Brooks, West Coast, Rocky Mountain, and Canada; C. F. Vincent, Gulf Coast, and Eastern areas, and J. P. Magoffin, Mid-Continent area. These men will handle all domestic sales for the two divisions, and foreign sales will be handled by Earl M. Rees, export manager, with offices in New York. Jack Smith, export representative, will make all trips overseas and headquarter in the Los Angeles office.

Lane-Wells Adds New Offices In Canada and Kentucky

The increasing development of two widely separated oil fields has prompted the opening of two new offices, according to a recent announcement by Lane-Wells Co. officials.

The first office has been established in Swift Current, Sask., and is under the direction of Lane-Wells Canadian Co., an affiliate of the American concern. This office will serve Lloydminister on the Northwestern - Saskatchewan-Alberta border, and the Coleville area in the Southwest, an area considered one of the foremost untapped regions in West-Central Canada.

The second location is in Henderson, Ky., in the Mid-Continent division. This office will serve southern Kentucky. Darrell E. Hout has been named station superintendent.

Richfield's "Success Story" Depicts Baker Oil Tools

Richfield Oil Corp.'s Southern California television program, "Success Story," recently featured Baker Oil Tools, Inc., and its new Los Angeles home over Station KTTV.

This program each week takes the viewer through some outstanding successful Southern California industrial plant, showing him how its products are made and introducing him to the people who make them. During the "Success Story" program in which Baker appeared, televiewers were shown by means of models something of oil-field operations, including drilling, running casing, and cementing. Against this background the audience was shown the part played by certain Baker tools in centering casing and placing cement. Next the viewers were taken into the Baker test laboratory to watch a length of casing equipped with centralizers, and a casing shoe being run into the well under conditions identical to those encountered in the field.

George Sanders, master of ceremonies, interviews R. C. Baker, Sr., founder of Baker Oil Tools, Inc., now in his eighteth year and still active as president of Baker. Also interviewed were T. Sutter, vice president and general manager, who demonstrated some of the tools, and Bill Althouse, chief engineer.

Beaumont and Atlas Hold First Sales Meeting

The first annual oil - field - equipment sales meeting of Beaumont Iron Works Co., and Atlas Engineering Works, sales representative for B.I.W., was recently held in Beaumont, Tex. Pictured on a tour of the plant are: Harry Zwerneman, of Beaumont sales department; E. L. Barker and Charles Warthen, of Atlas Engineering, and Fenton E. Cooke of Beaumont. Meeting was attended by engineering and manufacturing personnel of Beaumont Iron, and sales personnel from Atlas Engineering.

Schlumberger Expands In Rocky Mountain Area

Paul D. Chabas, area manager of Schlumberger Well Surveying Corp., Denver, has announced changes in the Rocky Mountain area to provide for expanded activity of the corporation.

R. P. Burton and C. A. Rosenthal have been appointed division managers for two new divisions which have been formed in the area.

Burton has been appointed Southern Rocky Mountain division manager with headquarters in Denver, and district offices in Farmington, N. M., Sidney, Neb., and Vernal, Utah. Burton joined Schlumberger in April 1940 as a field engineer in Houma, La. He was transferred to the Rocky Mountain area in 1945. For the past 2 years he has worked as assistant to the area manager in Denver.

Rosenthal has been appointed Northern Rocky Mountain division manager with headquarters in Casper, Wyo., and district offices in Casper, Cody, and New Castle, Wyo.; Glendive, Mont., and Williston, N. D. Rosenthal began with the company in June 1944 as a field engineer in Texas and Louisiana. He was made district manager at Oklahoma City in September 1948, and since November 1950 he has been district manager at Wichita Falls, Tex.

Webber is Appointed Chief Engineer for Oil Center Tool

J. C. WEBBER

Jack C. Webber has been appointed chief engineer for Oil Center Tool Co., Houston, John F. Maher, O-C-T president, has announced.

Webber comes to O-C-T from Atlantic Refining Co. where he was a mechanical engineer. He formerly was employed by Guiberson Corp. in Dallas from 1940 until 1946.

Well-Head Equipment Manufacturers Elect Officers

New officers and directors were elected by Association of Well Head Manufacturers at its recent annual meeting. Officers are: B. V. Fisher, Rector Well Equipment Co., secretary and treasurer; L. L. Rector, Rector Well Equipment, director; A. T. Lawrance, Beaumont Iron Works Co., president; E. L. Lorehn, Cameron Iron Works, retiring president; and L. D. Hilton, executive secretary. Donald U. Shaffer, of Shaffer Tool Works, is vice president. Directors are: L. L. Garber, of Hinderliter Tool Co.; Thomas J. Regan, of Regan Forge & Engineering; Glenn Johnson, of Baash-Ross Tool Co.; and Lawrence, Lorehn, Rector, and Shaffer.

Magnaflux Names Migel, Schiebel, Skeie to New Posts

H. MIGEL

Three important personnel changes within Magnaflux Corp. have been announced by F. B. Doane, president.

An entirely new major position, that of second vice president in charge of engineering, has been created in the company. Over-all direction of both research and design engineering will come under this officer. Named to the position is Hamilton Migel, previously second vice president and Eastern manager.

Roy O. Schiebel, Jr., currently Midwest manager in Chicago, will move to New York as Eastern manager, and Kermit A. Skeie follows Schiebel as Midwest manager at Magnaflux's Chicago sales offices.

Migel brings to this newly created position extensive engineering knowledge, and 12 years of broad experience with Magnaflux customers, having managed the company's offices in Detroit, Los Angeles, and New York. He will be located at the company's headquarters in Chicago.

Schiebel's experience includes weld engineering, and 12 years of outstanding work with Magnaflux customers. He has previously managed the West Coast and Midwest sales offices of the company.

Skeie, a metallurgist, is known in the Midwest as one of the company's most competent field engineers. He has worked with Magnaflux users for 8 years, in Illinois, Indiana, Kentucky, and Alabama.

Franks Sales Engineers Convene for Annual Meeting

Franks Manufacturing Corp. sales engineers convened in Tulsa recently for a week's annual sales meeting. Photographed as they congregated at the Franks plant to inspect current servicing units and workover rigs are, first row: H. E. Stanfield, Joe Rutledge, H. M. Maher, Johnny Leyh, Tommy Knoblick, and Vern Alley. Middle row: Jamie Deal, Doug Lawrence, Albert Hastings, Hilmer Heinritz, Dale Lamar, Bill Pitezel, A. H. Wilkinson, Jeff Gray, Dick Jones, John Ingram, C. C. Simmons, and Dudley Jordan. Back row: Arthur Sessler, John Howard, R. M. White, Carol Morrow, S. E. Corry, Carl White, Jr., H. A. Rogers, and Norman Massey. Franks district managers from sales and service branches at Alice, Houston, Odessa, and Kilgore, Tex.; Great Bend, Kans.; Casper, Wyo.; Compton, Calif., and the export representative, A. V. Simonson, of New York, attended the sales conference.

WECO Appoints Abshire To South Texas Area

I. D. ABSHIRE

John W. Gates, sales manager of Well Equipment Manufacturing Corp., has announced the appointment of I. D. Abshire as sales representative for the South Texas area, with headquarters in Corpus Christi, Tex. Abshire was formerly sales representative with National Supply Co., and Mission Manufacturing Co. Before starting his work in South Texas, he completed the WECO sales training program which includes a thorough study of production procedures in the plant. Abshire will replace C. J. (Chuck) Holcomb who is being

transferred to Houston for a special sales assignment.

Dowell Announces Changes in Sales and Management Staff

R. D. SHAW

Three important changes in sales and management staff of Dowell Inporated have been announced by A. C. Polk, Jr., general manager of the organization.

R. D. Shaw, Tulsa, has been named to the newly created post of director of sales. Marshall Stirling, Fort Worth, will replace Shaw in Tulsa as general sales manager. W. N. (Woody) Estel, Tulsa, has been promoted to assistant general manager.

Shaw has been with Dowell since the company was organized in 1932. In April 1933 he was transferred to Newton, Kans., where he remained 1 year before moving to Tulsa.

M. STIRLING

W. N. ESTEL

Stirling was previously located in Tulsa as sales manager of petroleum division before moving to Fort Worth in late 1950 to head an expansion program in the Fort Worth area. He joined Dowell in 1939 as a sales engineer, and was named petroleum division sales manager in July 1946.

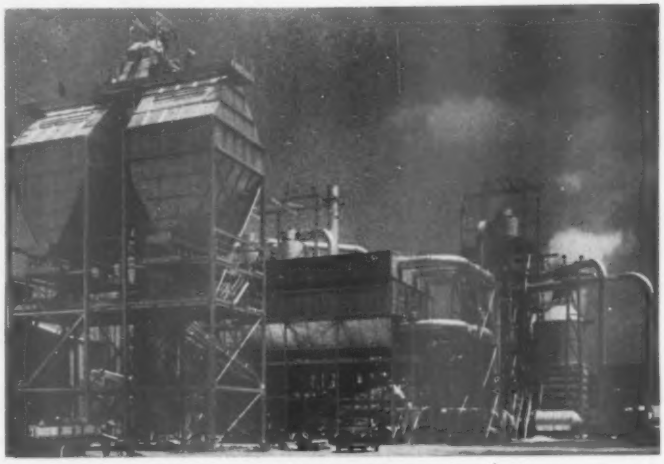
Estel began with Dowell in July 1940 as a service engineer. In 1942 he was made station manager at the Dowell office in Grayville, Ill. In April 1945 he was transferred to Borger, Tex., as district manager of the Panhandle area. In early 1948 Estel was placed in charge of Dowell's West Texas area as district manager at Midland.

ALCOA Appoints Stakel As Advertising Manager

Frederick C. Stakel has been made advertising manager for Aluminum Co. of America, it was recently announced by Arthur P. Hall, vice president in charge of public relations and advertising.

Stakel has been manager of advertising and sales promotion for Brown Co., Berlin, N. H., since 1947. Previously he was New York district manager for Scott Paper Co.

Great Lakes New Diatomite Plant Now in Production



New diatomite plant of Dicalite Division, Great Lakes Carbon Corp., Lompoc, Calif., which illustrates complex system of piping, cyclones, and bins.

The new diatomite plant of Great Lakes Carbon Corp., Lompoc, Calif., began actual production in April, with shipment of the first carload of Dicalite products, according to Walter Gramm, senior vice president of Great Lakes. The new plant reached near full production by the first week in May.

Gramm stated that the new plant is the largest complete unit for processing diatomite built in the last 22 years. When the production capacity of the Lompoc unit is added to that of its three other plants in operation, the Dicalite division's total production capacity will be raised to approximately two-thirds of the largest annual tonnage of diatomite materials ever produced in the United States, Gramm stated.

Following the trend in today's industrial construction, the new Dicalite plant is of the outdoor type, according to Edward A. Harris, operations manager. The only operation in an enclosed building is the final bagging of the finished products. Safety was a major consideration in design and construction of the new Dicalite plant. In addition to numerous mechanical safeguards against accidents, the designers provided measures for dust control, which is a problem in all nonmetallic mineral processing plants.

Mission Appoints Brown To Kansas Sales Post

Appointment of J. H. (Henry) Brown as Mission Manufacturing Co. sales representative in the Russell, Kans., area has been announced by W. T. Campbell, executive vice president of Mission.

J. H. BROWN

Brown was formerly associated with Continental Supply Co.

Grove Regulator Names New Southwest Sales Manager

Grove Regulator Co. of Emeryville, Calif., has announced the appointment of George M. Theimer as southwestern divisional sales manager with headquarters in the firm's Houston offices. Theimer will direct sales activities in the Mid-Continent and Gulf Coast areas where Grove valves, regulators, and pressure and flow control systems are in extensive use by the petroleum and natural gas industries.

G. M. THEIMER

Theimer's background includes 22 years of diversified sales and engineering experience.

Fontaine is Promoted By Atlas Engineering

Announcement has been made of the election of T. L. (Tom) Fontaine, Jr., as vice president and district manager of sales for Southwest Texas division of Atlas Engineering Works, sales agents for Beaumont Iron Works of Beaumont. His headquarters will be at Houston.

Fontaine has been associated with Atlas since 1949. He is a graduate of University of Texas.

Southern Geophysical Co. Expands Field Operations

G. D. LARSON

Expansion of Southern Geophysical Co. field operations has necessitated the advancement of three men to the supervisory staff of the company, according to Dr. Sidon Harris, president. G. D. Larson, John N. Botkin, and W. W. Deaver have been appointed to Mid-Continent, Rocky Mountain, and Southeast Gulf Coast areas, respectively.

J. N. BOTKIN

W. W. DEAVER

Larson, supervisor for Kansas operations, is stationed in Great Bend, Kans. He joined geophysical department of Stanolind Oil & Gas Co. in 1941, and in July 1950 he began with Southern Geophysical. Larson has had considerable experience in Kansas, Gulf Coast, and Rocky Mountains.

Botkin has been on the Southern staff for 5 years and, following his recent return from Korea, is being advanced to assistant supervisor based in Billings, Mont. He has had geophysical field experiences in East, North, and West Texas, and New Mexico.

Deaver, who joined Southern 4 years ago, has been promoted to assistant supervisior in the Florida - Alabama area. He is a graduate of University of Arkansas with a B.S. degree in civil engineering.

Oilwell's New California Area Headquarters

The completion of an extensive program of facilities improvement, and personnel appointments in the California area were recently announced by Donald S. Grubbs, California area manager of U. S. Steel's Oil Well Supply Division.

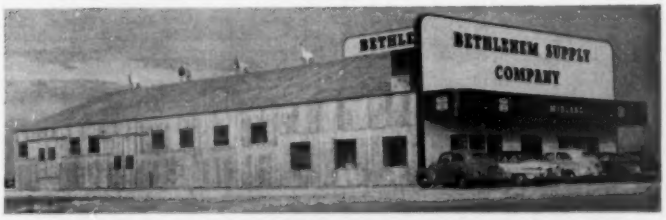
Climaxed by the opening of a large new unit in the Vernon industrial area in which the headquarters offices of the California area have been moved to spacious, modernized quarters, the program includes the establishment of a new field store, construction of a new building for a second store, and the remodeling of two other stores.

Offices of the California area headquarters occupy 5,600 sq. ft., and are housed in a 54,000-sq. ft. structure which has been remodeled to accommodate large stocks of machinery and supplies for the oil industry, and a big repair shop. The new facility is built on a 2-acre plot, with a paved storage yard of more than 26,000 sq. ft. The shop building is equipped with an overhead crane which also services the storage yard.

A new "Oilwell" store has been opened at Castaic Junction in a newly completed building. James Doan, formerly manager of the Ventura store, is store manager. Nelson Harpold has been named manager of a new building constructed at Ventura. The Bakersfield store has been enlarged and improved, and Arne Johnson and Amos Cooke have been added to the sales staff. Carl L. Schwab, Jr., is store manager. In addition, the Long Beach store, whose manager is C. R. Malone, has been remodeled, and at the Taft store, Paul Paulsen has been added to the sales staff.

Further organizational changes in California include the appointments in the area headquarters offices of R. T. Watkins as engineer, Eric Lemke as manager, drilling equipment sales, and John Brown, office manager. Tom Hill and Norman Kirkland have been added to "Oilwell's" city sales staff in Los Angeles.

Bethlehem Opens New Supply Store at Midland, Tex.



Bethlehem Supply Co. recently opened its newest and most modern store in Midland, Tex., which is one of Bethlehem's largest installations. Complete stocks of drilling, production, refining, and pipe-line supplies will be maintained at this store to serve the Spraberry area in the eastern sector of the Permian basin. Bethlehem's engineering experience in drilling, refining, and artificial lift will now be available to this area. The new store will be under the supervision of W. A. LaRew, district manager, Midland. B. K. Smith, formerly in charge of the Snyder, Tex., store, is store manager.

CLASSIFIED ADVERTISING

Your MARKET PLACE FOR THE OIL AND GAS INDUSTRY...

UNDISPLAYED CLASSIFIED 15c a word one issue. 10% Discount three or more consecutive issues. $3.00 minimum charge. Blind Box in our care nine words. Payable in Advance.

DISPLAY CLASSIFIED
$12.00 a column inch one issue . . .
10% Discount three or more issues.

Address Classified Advertising Material: The Oil and Gas Journal, P. O. Box 1260, Tulsa 1, Okla.

EQUIPMENT FOR SALE

LIKE NEW D-13000 Caterpillar, Twin Disc Clutch and Sheave. 2951 actual hours. Price $3500. C. Spitzfaden, Box 2001, Wichita, Kansas, LD 128.

FOR SALE: Good 3½" and 4½" OD Drill pipe. Two EKU Waukesha's, One RL Cardwell, Hercules Engine, Tanks, Treaters, Pumping units. Rogers Pipe & Supply Co., 630 Wright Bldg., Tulsa, Oklahoma.

FOR SALE: One 97' Lee C. Moore "jackknife" derrick with crown and seven foot sub-structure. One Cardwell draw works powered with 145 GKU Waukesha motor. 5,000' 4½" drill pipe. For complete information and price write Mack Well Servicing Company, 717 Wilson Building, Corpus Christi, Texas.

AVAILABLE for immediate delivery TWO MOBILE REPAIR SHOPS designed to provide mobile facilities for maintenance and repair of vehicles, construction and industrial equipment; test used only, equal to new. Write for further particulars; $20,000 each f.o.b Los Angeles. EXPORT TRADING CO., 1921½ Talmadge Ave., Los Angeles 27, Calif.

TWO O C S Duck, One C D 70 Emsco pumping units complete with 15 HP Electric motors, Allen-Bradley controls all in good condition. 3700 feet 3" 9.3 lb. EUE tubing, 2500 feet 3" regular tubing, 6000 feet ⅞" sucker rods, 2500 feet 3" line pipe. All good material, Lease being abandoned. 2800 feet 8⅝" casing to be pulled. A. M. Moore, McCamey, Texas. Phone 46.

FOR SALE: New 46 O.F. Cyclone drill, rated 2000' capacity, 65 H.P. gasoline engine with natural gas carburetor, 60' telescoping derrick, power derrick hoist, cat head, casing reel, and stem guide. Also, one used 44 Std. Cyclone drill 6 cylinder motor, 40' telescoping derrick, power derrick hoist, stem guide, cat head. Machine less than a year old. Will carry factory guarantee. Sanderson Cyclone Drill Co., Orrville, Ohio.

USED MACHINERY

PRICED TO SELL

Cox and Sons Bucking and Threading Machine with following dies: 4 to 4½", 5 to 6", 7 to 8", 9 to 10", 11 to 12". Quantity of engine repair shop tools, both hand and power operated, with necessary gauges.

Above equipment now located at our Abilene plant. Lincoln 300 amp. Arc Welding Machine powered by model 2-71 G-M Diesel engine. Unit is covered and mounted on trailer with pneumatic tires. Located at our Odessa plant.

USED ENGINES AND ROTARY EQUIPMENT FOR SALE

See, write, or call:

EMPIRE MACHINERY COMPANY

Abilene, Texas — Phone 4-8196
Odessa, Texas — Phone 6-9151

7500' OF API Full Hole 4½" Drill Pipe. Graded and tested by Sonoscope engineers. Milford Giffin, Giffin Hotel, Tel. 477, Hoisington, Kansas.

WELL SERVICING UNITS — Skid type, Single Drum Cardwells, Wilsons, Allis-Chalmers, Muskogee, Kelmer, Double & Single Pole Mast. Have Draw Works on long skids w/ 86' Double Pole Rotary Mast for shallow well rotary. For sizes & prices—Write General Tool & Supply Co., P. O. Box 4387, Oklahoma City.

FOR SALE: Unit Rig U-34 draw works with 2—145 GKU Waukesha engines and 2—10,000 series Twin Disc Torque converters; 1—7¼" X 14" Gardner Denver Pump powered with a V-12 LeRoi; 96' Lee C. Moore mast with 7' substructure. This rig is complete with drill pipe and drill collars, ready to drill, located at Hobbs, N. M. Sharp Drilling Company, Box 1271, Midland, Texas.

WICHITA SPUDDER Model No. 61 with almost new special rebuilt mast. Handles 4500' 7" casing. Complete in every respect with LeRoi six engine on skids butane equipped, 1650 gallon tank, tools from 10" to 5", 4 drilling stems, 3 underreamers, 2 sets underdiggers, new Kohler light plant, new steel tool house, 3 sets elevators, casing spiders with slips 10" to 7", electric blower, forge, fishing tools including rope knife, floor sills. Inventory furnished upon request. George Proctor, City National Bldg., Wichita Falls, Texas.

for
VALVES • FLANGES • FITTINGS
it's
Newman's Inc.
"One of the Southwest's Leading Distributors"
Tulsa, Okla. P.O. Box 1865 Ph. 25228-LD 635

2—**WORTHINGTON Type 4HR5 Pumps** Capacity 1000 GPM; 625 ft. Head driven by 200 HP. "General Electric" AC Motor 3/60/2300 V — 3500 RPM. Attractively priced.

J. A. DOUGHERTY
P.O. Box 90 — Bala-Cynwyd, Pa.

FOR SALE

7—CLARK GAS ENGINE GAS COMPRESSORS

1—230 H.P.—17x18x26x20
1—230 H.P.—17x18x24x20
1—230 H.P.—17x18x24x20
1—200 H.P.—16x7½x10x20
1—165 H.P.—17x6½x16x20
1—80 H.P.—16x8½x20
1—80 H.P.—16x7½x20

Complete and in good operating condition. Located at Benton, Illinois.

BROWN-STRAUSS CORPORATION
P.O. 78, Kansas City 10, Missouri

Norman Strauss, Phone HArrison 1000
Salesmen on premises, contact R. V. Crisp, Phone 1419 or 610, Benton, Illinois.

FOR SALE: At Oklahoma City, 3—3" used Dean-Hill high pressure 4 stage Centrifugal pumps, 60 GPM-3450 RPM, 300' Head, 3" Suction, 2" Discharge, mounted on Cast Iron base and driven by 30 HP 3 phase 60 Cycle, 440 Volt, Type FK, Frame 265S, Form A, Louis-Allis motors. Cities Service Oil Company, Patridge, Bartlesville.

FOR SALE: Wilson Giant Draw Works complete with 2-JL-1335 Buda Motors compounded and ready to run $7500. Also 4500' 4½" good used Drill Pipe; Butane Tank and other items at reasonable prices. Address 306 Derby Building, or telephone 5-4172, Wichita, Kansas.

PIPE FOR SALE: 25,000 ft. 8⅝" OD, 28-lb. Line Pipe; cleaned and beveled for welding; single random lengths; #1 condition. 25,000 ft. 6⅝" OD, 19-lb. Line Pipe, cleaned and beveled for welding; single random lengths; #1 condition. Ready for immediate shipment. Contact: The Tri-State Pipe Company, Bellaire, Ohio, Phone 42.

FOR SALE: 15000' Rig. Bethlehem MC-950 draw works; 3 engine chain compound with double pump drive; 3 LRO Waukesha engines; 1—7¾" X 18" G600 Bethlehem Pump; 1—7¼" X 16" G300 Bethlehem Pump; Lee C. Moore 136' Cantilever mast with 14' substructure; 2—12" QRC Cameron Blowout Preventors. This rig is complete with drill pipe and drill collars, ready to drill, located in Lea County, N. M. Sharp Drilling Company, Box 1271, Midland, Texas.

FOR SALE

Franks Model S.A. 4500 Rotary Rig, now in operation, with two newly rebuilt Cummins Diesel engines, and 4500 feet of 4½ inch drill pipe.

SHELLEY-MILLER DRILLING, INC.
205 Miller Building, Wichita, Kansas
Phone 3-9063

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units, Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 123—Rockdale, Texas
AT-3437—Houston, Texas

TANKS FOR SALE

Good as new, for immediate delivery. One 80,000 BBL. Seven Ring all steel tank for $25,000.00. Three 55,000 BBL. Five Ring all steel tanks for $17,500.00 each. As is where is and subject to prior sale. We will also cut down and re-erect as welded tanks either of the 55,000 BBL. tanks above for $38,500.00. Or we will cut down and re-erect the 80,000 BBL. as a welded tank for $50,250.00. These are rivited tanks and of standard construction and may be inspected now near Shreveport, La. Contact by mail or phone

We will trade any of the above tanks for Scrap iron.

CLYDE DAMPF, INC.
Box 2515, Amarillo, Texas. Phone 3-3000

EQUIPMENT FOR SALE

1, S-32 ($17,500.00), or 1, S-32 Special ($22,-500.00) Walker-Neer Spudder. Each unit new, trailer mounted, and complete with tools. Fine, heavy equipment. Inventory available. Emanon Drilling Co., Inc., Abilene, Tex.

WELL drilling equipment, new or used. Spudders, rotaries, core & shot hole drills, tools, pipe, bits, blocks, pump jacks, valves. Everything for well drilling and service. Fishing tools rented. Pressey & Son, Pueblo, Colo.

FOR SALE: One 36-L Bucyrus-Erie drilling machine, complete with tools. Also 1,942 ft., new 7 inch, 17 lb., H-40, range 2, seamless casing and 2,409 ft. of new 2⅜ inch, 4.60 lb., range 2, J-55, seamless regular tubing. Box E-812, The Oil and Gas Journal, Tulsa, Oklahoma.

COMPLETE DRILLING RIG: 98′ Lee C. Moore jackknife derrick with 8′ substructure, late model R double drum Cardwell draw works powered with 236 HP—6 cylinder WAKU Waukesha motor, one 7¼ x 14 Wheeland pump, one 5 x 10 Gardner pump, 17½″ oil well rotary, 5,000′ 4½″ drill pipe, two drill collars, subs, slips, steel house, bunk house, two water pumps and two light plants. All in first-class condition. For complete information and price write Mack Well Servicing Company, 717 Wilson Building, Corpus Christi, Texas.

FOR SALE: Two truck-mounted Bettis steam generators; one 30 hp. on a '48 Ford C.O.E.; one 40 hp. on a '41 Chevrolet 4 by 4. Both units completely equipped. Also selling yard and building at Russell, Kansas. Going out of business. Dave Edmiston, Russell, Kans.

NEED a good 4500 foot draw works? Wilson Giant, Vacuum controlled, GM 12103 Twin Six Diesel, Pump drive, Friction catheads. Excellent running condition. Located Great Bend, Kansas. C. Spitzfaden, Box 2001, Wichita, Kansas. L. D. 128.

FOR SALE: 20 pressure tanks 8′ diameter X 16′ high ⅜'s welded and riveted construction—with mounted feet on sides. Top and bottom equipped with gasket pressuretype heads. 20 units available each $450.00 f.o.b. western Pennsylvania. Box E-737, The Oil and Gas Journal, Tulsa, Oklahoma.

WE sell used/rebuilt Well Drilling Equipment, Bulldozers, Draglines, electric generating plants, air compressors, trenchers, railroad equipment, surplus machinery, etc. Mr. Gonzalez, Baker Export Co., Pecos, Texas.

USED TANKS FOR SALE: 5 Steel 55000 Barrel Riveted Tanks. Can be reset Floating Top. Price on negotiation, contact C.B.S. Steel & Forge, 3321 E. Slauson Avenue, Los Angeles 58, California. Phone LAfayette 0147.

FOR SALE: 136′ Muskogee 800,000# API Capacity Steel Derrick, 9′ 1,000,000# Sub-Structure with lumber and timbers. Good shape, drilled only 7 wells, dismantled. $7,500.00 FOB location. Grady Forbes, 6-3552, Box 2649, Odessa, Tex.

FOR SALE: 15000′ Rig. Bethlehem MC950 draw works; 3 engine chain compound with double pump drive; 3 LRO Waukesha engines; 1—7¾″ X 18″ G600 Bethlehem pump; 1—7¼″ X 16″ G300 Bethlehem Pump; Emsco 136′, 800,000# capacity derrick; 9′ engine sub-base; 2—10¾″ QRC Cameron 6000# test blowout preventors. This rig is complete with drill pipe and drill collars, ready to drill, located in West Texas. Sharp Drilling Company, Box 1271, Midland, Texas.

EQUIPMENT FOR SALE

CABLE rig for 6,500′ on oilfield bed tandem truck. Bargain. G. M. McLaughlin, 3506 West Pikes Peak, Colo. Springs, Colo. Phone 6887J.

FOR SALE: 40 HP. Lufkin Cooper-Bessemer Diesel Type GSDH with clutch, oil pump, radiator, Maxim silencer; used 15 hours. Lloyd-Smith Company, Inc., Bradford, Pa.

INVASION PIPE—5700′ of 6″ invasion pipe with or without couplings in excellent condition; used short time for water line. Oil Field Salvage Company, Breckenridge, Tex.

EQUIPMENT WANTED

WILL PAY highest prices for used casing used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Greer Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

WE BUY well drilling equipment machines, cable tools, pipe, etc. Turn your surplus equipment into cash. Pressey & Son, Pueblo, Colorado.

WILL pay cash for your surplus equipment — Engines, Generators, and Electric Motors. Brazos Engineering Co., Inc., 224 Raines Street, Phone FAirfax 8367, Houston, Texas.

WANTED: 24 or 28-L Bucyrus Spudder, with tools. Prefer 28. Price, location of tools. Write S. C. McCoun, Jackson, Ky.

WANTED TO PURCHASE
USED PIPE
All sizes 3″ through 26″
O.D. in straight or mixed carload quantities.

USED BOILER TUBES
2¼″, 3¼″, 3½″, 4″, 5⅜″ and 5½″ O.D.

Highest Prices Paid.

Write—Wire—Phone.

SONKEN-GALAMBA CORPORATION
2nd and Riverview (X-856)
Kansas City 18, Kansas
THalcher 9243

HELP WANTED

OIL Industry Employment Service, 405 Tuloma Building, Tulsa, Okla. 4-5974. Tom Robinson, owner. For Technically trained personnel. No fees. Confidential.

BOOKKEEPER & Steno. for newly organized drilling and producing company. Must have had 5 years' experience with drilling tools. Give reference and history for past 5 years. Box E-806, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Capable geologist by aggressive independent refining and marketing company now starting oil exploration program. Prefer settled, married man about 35, graduate of Oklahoma or Texas University, plus field experience and ambition. Petco Corporation, 425 Wilson Building, Dallas, Texas. Phone PRospect 1392.

HELP WANTED

WANTED: Combination Safety Engineer and Metal Inspector. Southwest Refinery. Box E-681, The Oil and Gas Journal, Tulsa, Oklahoma.

SEISMIC PERSONNEL: Party chief, surveyors, observer and shooters for oil company establishing its own geophysical department. Excellent opportunity for right men. Box E-795, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEERS, GEOLOGISTS, DRAFTSMEN, CARTOGRAPHERS, needed for Rocky Mountain area positions. We bring employer and qualified applicant together. Professional Placement Service, 516 Univedsity Building, Denver, Colo.

GEOLOGIST

For subsurface work in Saudi Arabia. Degree plus 5 years' experience in well-sitting, and with some knowledge of micro-paleontology. Salary open.

Write giving personal history and work experience. Please include telephone number.

Box E-826
THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

Chemical Plants Division
Blaw-Knox Construction Co.

Needs

Process Engineers
Piping Design Engineers
Mechanical specification Engineers
Planning and scheduling Engineers
For Tulsa Office

Electrical Engineers
For Tulsa and Pittsburgh, Pennsylvania Offices

Construction Field Accountants
For Assignment From Tulsa Office

Must Be Experienced in Refinery, Gasoline, Industrial and Chemical Plant Work

P. O. Box 1266 **Tulsa, Okla.**

NEW IMPORTED SEAMLESS,
J-55

5½″ x 14#, 15½# & 17#, Short T & C
2⅞″ EUE Tubing, 3½″ PE Tubing 4½″, 6⅝″ & 7″ Casing PE or T&C Available June 20th, Houston, Texas.

BARON TUBE COMPANY
722 Oliver St., N.W.
Atlanta, Georgia
Importers of Casing & Tubing
Phone: Atwood 9721-2

OPPORTUNITIES FOR
TECHNICAL REFINERY PERSONNEL
for
LARGE INTERNATIONAL OIL COMPANY

Entertaining applications of graduate chemical, mechanical, structural and electrical engineers for refinery engineering assignments at home and abroad.
Engineers with refinery experience and also recent graduates will be considered.

Box E-667, The Oil and Gas Journal, Tulsa, Oklahoma

HELP WANTED

KEY Seismograph Personnel Needed by Established and Expanding Seismograph Company. Box E-616, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED — SEISMOGRAPH PARTY CHIEF. Must be fully qualified. Age 27-38. A good opportunity for the right man. Box E-770, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM GEOLOGIST
Moderately sized company with active exploration program desires petroleum geologist with minimum of three years' experience, qualified to do subsurface mapping and act as assistant to district geologist in Louisiana and Mississippi. Write, giving details of experience and training and salary desired. Box E-800, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEERS, Executives, Technical Men. Salaried positions—$3600 to $30,000. This confidential service for outstanding men who desire a change of connection. Will develop and conduct preliminary negotiations without risk to present position. Send name and address for details. Tomsett Associates, 334 Frick Bldg., Pittsburgh 19, Pa.

RESERVE Engineer, around five years experience in valuations. Midwestern independent operator. State age, references, training and salary desired. Box E-814, The Oil and Gas Journal, Tulsa, Oklahoma.

MECHANICAL Engineer: For technical administrative position in responsible charge of research design and development section in rapidly growing progressive organization. Opportunities to apply one's own initiative and originate personal ideas almost unlimited. Five to fifteen years of versatile experience in broad design fields required. Salary commensurate with qualifications. Location Southwest. Write C. D. Pengelley, P. O. Box 2296, San Antonio, Texas.

SITUATIONS WANTED

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 1628. Ph. No. 3-3141, Hobbs, New Mexico.

GEOLOGIST-GEOPHYSICIST: Eight years surface, seismic interpretation, subsurface, reserves work; last six Venezuela; desires permanent location Denver, subsurface and reserves calculations. Graduate, veteran, married, 32. Box E-813, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOPHYSICIST—Geologist — Geochemist, Consulting—Land and leasework. Twenty years experience in field operation and data interpretation. Desires full or part time employment in Illinois Basin. Now resident of Mattoon, Illinois. C. G. Rosaire, Box 352, Mattoon, Illinois.

SENIOR Process Engineer desires responsible position as operating supervisor, process engineer, or executive's technical assistant in refining, natural gasoline, or petrochemical industry. Twelve years refining experience includes catalytic, thermal cracking; catalytic, thermal reforming; coking; alkylation; polymerization; gas recovery; stabilization. Ambitious. Age 34, married, two children. Foreign locations considered. Box E-796, The Oil and Gas Journal, Tulsa, Oklahoma.

CORROSION ENGINEER Graduate. 5½ years pipe line experience. Cathodic protection bare & coated lines plus coating inspection. Desires change involving minimum of traveling. Box E-794, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION SUPERINTENDENT. Graduate Petroleum Engineer. 12 years responsible experience producing industry. Geological ability. Mid-Continent or Rocky Mountains. Box E-774, The Oil and Gas Journal, Tulsa, Oklahoma.

EMPLOYED, desires change to progressive drilling or producing firm. 17 years' experience drilling, producing, petroleum engineer. Age 38. Box E-808, The Oil and Gas Journal, Tulsa, Oklahoma.

SEISMOGRAPH Party Chief, age 39, seven years' experience in the Mid-Continent area, desires job as interpreter with permanent location. Box E-807, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

GEOLOGIST: Eight years' experience, desires work with major or substantial independent company. Box E-811, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY SUPERINTENDENT
Competent and experienced. Excellent record efficient operations, maintenance and construction. Box E-810, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST, now employed. Age 29, B.S. Degree, Veteran. Two years extensive experience in three geologic provinces. Prefer position with progressive independent company in Rocky Mountain Area. A sound future and chance for advancement important. Box E-815, The Oil and Gas Journal, Tulsa, Oklahoma.

MAINTENANCE and Schedule Engineer—6 years in 35000 BPD petroleum refinery; 2 years' experience in sanitary engineering and water works. Available after July 1. Box E-798, The Oil and Gas Journal, Tulsa, Okla.

LEGAL BLANKS

BURKHART LEGAL BLANKS since 1908. Oil-Gas (all states), Business, Real Estate, Legal Forms. Leases, Revised With Government Regulations, Commercial Printing. Catalog and Samples on request. Burkhart Printing & Stationery Company, 115 South Cincinnati, Tulsa, Oklahoma.

BUSINESS OPPORTUNITIES

COMPANY with new warehouse and office facilities in Odessa and well established with Permian Basin Drilling and Production Accounts desires to represent manufacturer of production or drilling specialities. A more complete description of company's facilities and sales potential can be obtained by writing Box 2466, Odessa, Texas.

MANUFACTURERS! A well established company with office and warehouse in Odessa, Texas, maintaining an experienced sales force in close contact with drilling, production, and supply companies of the entire Permian Basin, desires to represent manufacturer of highest quality oil field specialties. Address Box E-787, The Oil and Gas Journal, Tulsa, Okla.

MANUFACTURER of well established line of drilling equipment desires representation in Oklahoma, Kansas, Illinois, and Rocky Mountain areas through Manufacturers Agent. Send full particulars. P. O. Box 1436, Houston, Tex.

10,000 FOOT test proposed for South Georgia as result Geophysical work recent months. For details write C. W. Deming, Waycross, Ga.

REAL ESTATE

LOVELY summer home in exclusive mountain resort area near Pikes Peak. Polished log construction, corner fireplace, two bedrooms, sleeps ten, basement garage and storage, all conveniences. Good fishing. $20,000 furnished. S. T. McMurrain, 5201 Bryan Street, Dallas, Texas, or Lake George, Colorado.

SERVICES

GAS MEASUREMENT
Attention Small Gas Operators: Technical advice on gas problems, meters inspections, charts computed and purchasers billed. Please write us about this service. Box 7261, Tulsa, Okla.

FOR SALE MAPS

WILLISTON BASIN MAPS

JUST COMPLETED

COVERING: North Dakota, South Dakota, East Montana, Northeast Wyoming.

SHOWING: Structures, Township and Range, County Outline, County Seats. All wells drilled or drilling. Total depths, Completion Dates, Operators' names. Size 42" x 54".

Price $8.00 Paper, Linen $17.50

Individual County Ownership and Lease Maps

(Twenty-three county maps in stages of completion in the Basin.)

Scale: 1 inch equals 4,000 feet

Published and for sale by

NORTHWEST MAPPING CO.

117½ Fourth Street Phone 3457

Bismarck, North Dakota

ROYALTIES

WILLISTON BASIN ROYALTIES
Dealers in Montana royalties since 1931, we now specialize in royalties under major company leases in the Montana portion of the Williston Basin. For information on our method of operation, write LANDOWNERS ROYALTIES COMPANY, Box 1225, Great Falls, Montana.

WE will buy producing or non-producing oil royalties. Standard Security Company, 111 Broadway, New York 6, N. Y.

PRODUCTION
Producing landowners royalty and producing leases. Any amount, any area. Confidential information required and given.

A 1 Bank References

COMBEST ROYALTY COMPANY
825-826 Amarillo Building
Amarillo, Texas

LEASE AND DRILLING BLOCKS

PRODUCTION for Sale: Two producing wells on 40 acre lease near Tulsa. Must sacrifice immediately. Post Office Box 26, Tulsa, Oklahoma.

WE invite inquiries from persons interested in Oil and Gas Leases in Southern Alberta, North Central Montana and the Williston Basin. Box E-664, The Oil and Gas Journal, Tulsa, Oklahoma.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

FOR SALE by Land Owner: 5 year oil & gas lease, Colorado County, Texas. Columbus Tap Survey, Abstract 153. Near production gas-distillate. $20.00 Bonus, $5.00 Rental, 1/32 OR. P.O. Box 5117 West Austin Station, Austin, Texas.

SOUTH Dakota State Land Lease auction June 23rd. Over five hundred thousand acres at auction. I will represent you at this sale. Write or wire instructions. My fee twenty-five cents acre. John F. Schoof, Gettysburg, South Dakota.

FOR SALE: 400 acre oil lease in southeastern Kansas suitable for water flood. Bartlesville sand depth 700 feet has 9 producing wells. Box 174, R.R. #2, Parkville, Missouri.

22,000 ACRE block for lease in Williams County, North Dakota—heart of the Williston Basin. Public Law 160 has now made this land available for leasing by property owners. The last big unleased block in Williams County, North Dakota. Direct inquiries to Jim Martin, Secretary, Trenton, North Dakota.

OWNER in Bowling Green, Ohio, has 700 acres in Texas location wants to sell his interest. Advise Frank E. Miller, Room 42, 1469 West 3rd Street, Cleveland 13, Ohio.

OIL LEASES: A number of 160 and 640 acre tracts in Grant and western North Dakota counties, reasonable. Write P. O. Box 344, Carson, North Dakota.

LEASES ROYALTIES
Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited

B. D. BUCKLEY
6835 Delmar Ave., St. Louis 5, Mo.

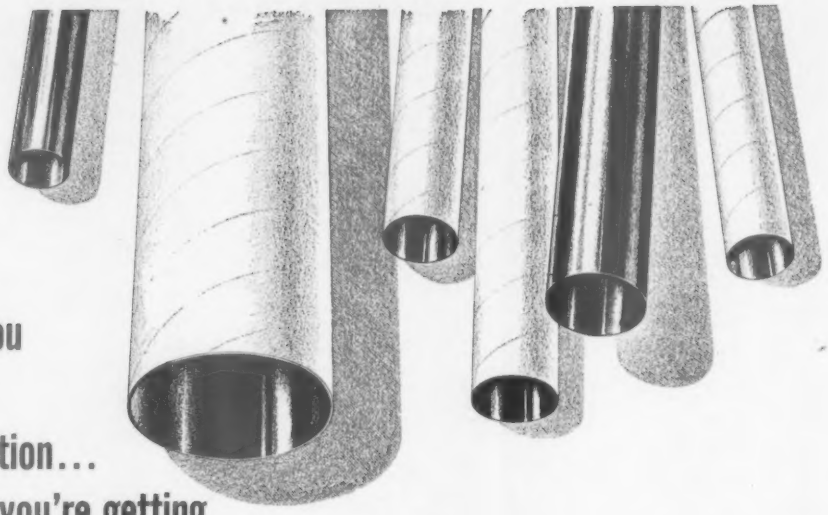
NORTHWESTERN NORTH DAKOTA LEASES AND MINERALS

Our latest lists with prices, mailed on request. Will also buy acreage where you want it. Any place in Northwestern North Dakota. References exchanged.

BORSTAD & FITZMAURICE
Oil Properties
4th Floor 1st National Bank Bldg.
Phone 48-238 Minot, North Dakota

ADVERTISERS

A-1 Bit & Tool Company 10
Abegg & Reinhold Co. 397
Aerequip Corporation 76
Aerotec Corporation, The 100
Air Reduction Sales Co. 126
Aldrich Pump Co., The 93
Allis-Chalmers Mfg. Co. 65
Allis-Chalmers Mfg. Co. (Tractor Div.) 369
Allen Foundry & Machine Works 233
Aluminum Co. of America 337
American Car and Foundry Company 335
American Hoist and Derrick Company 395
American Iron & Machine Works Co. 379
American Locomotive Company 46
American Manufacturing Co. of Texas 4
American Meter Company 40, 41
American Pipe & Steel Corporation 62
American Recording Chart Co. 330
Ammann Photogrammetric Engineers, Jack 103
Ampco Metal, Inc. 415
Ansul Chemical Co. 269, 334
Armco Drainage & Metal Products, Inc. 396
Armstrong Bros. Tool Co. 380
Associated Oil Field Rentals, Inc. 384
Associated Research, Incorporated 341
Attapulgus Clay Company 74
Axelson Manufacturing Company 70, 146
Bandy Hose Tool Company 372
B and W, Incorporated 438
Baker Oil Tools, Inc. 166
Barrett Division of Allied Chemical & Dye Corp. 432
Bethlehem Supply Co. 99
Black, Sivalls & Bryson, Inc. 359
Blaw-Knox Construction Company 69
Bonney Forge & Tool Works 47
Boston Woven Hose & Rubber Company 124
Bovaird Supply Co., The 63
Bowser, Inc. 396
Brewster Company, Inc., The 53, 54
Bristol Company, The 125
Brown Fintube Co., The 109
Buchanan Drilling Company, Al 332
Bucyrus-Erie Co. 34, 144
Buda Company, The 36
Buiter Manufacturing Co. 79
Byron Jackson Co. 107
Camco, Inc. 367
Cameron Iron Works, Inc. 131
Cardwell Mfg. Co., Inc. 208, 209
Catawissa Valve & Fittings Co. 364
Caterpillar Tractor Co. 6
Chapman Valve Mfg. Co., The 92
Chase Brass & Copper Co. 128
Chevrolet Motor Div., General Motors Corp. 71
Chicago Bridge & Iron Company 365
Cities Service Oil Co. 330
City National Bank of Houston, The 249
Clark Bros. Co., Inc. 32, 33
Classified Advertising 447, 448, 449, 450
Cleaner Pipelines Co. 396
Cleveland Worm & Gear Company, The 28
Columbian Steel Tank Co. 29
Commercial Iron Works 294
Construction Machinery Co's 332
Continental Electric Co., Inc. 377
Continental Motors Corp. 31
Continental Supply Co., The 435, 436
Cooper-Bessemer Corp., The 226, 227
Cooper, Inc., Fred E. 417
CO-Two Fire Equipment Company 78
Coyle Lines, Incorporated 431
Cuiler-Hammer, Inc. 66
Darling Valve and Mfg. Co. 428
Davis Regulator Co. 355
Davison Chemical Corp., The 49
Day Company, S. D. 368
Dean Brothers Pumps, Inc. 329
Dean Hill Pump Company 60
De Havilland Aircraft of Canada, Limited, The 340
Delta Engineering Sales Co. 403
Detroit Diesel Engine Division, General Motors Corp. 101
Dollinger Corporation 120
Dow Chemical Co., The 295
Dowell Incorporated 168
Dresser Industries, Inc. 50, 361
Dresser Manufacturing Division 50
Drilling & Service, Inc. 430
Drilling Specialties Co. 406
Duff-Norton Mfg. Co., The 309
du Pont 3, 28
Durabla Manufacturing Company 152
Dynamatic Corporation, Subsidiary of Eaton Manufacturing Company 236
Eastman Oil Well Survey Company 327
Eaton Manufacturing Company, Axle Div. 237
Edward Valves, Inc. 127
Elder & McNulty 380
Electric Auto-Lite Co., The 423
Empire Trust Company 438
Ensign Carburetor Company 18
Equitable Equipment Co., Inc. 377
Ethyl Corporation 19, 20
Fairbanks, Morse & Co. 2
Farrel-Birmingham Co., Inc. 12
Federated Metals Division American Smelting and Refining Co. 341
First National Bank & Trust Co. of Tulsa, The 417
First National Bank in Dallas 42
First National Bank of Shreveport, The 363
Fisher Governor Company 72
Fisher Research Lab., Inc. 408
Flexonics Corporation 96
Fluid Packed Pump Company 361, 362
Fluor Corporation, Ltd., The 330
Ford Motor Company 276
Foster Cathead Company 310
Foster Company, L. B. 280
Foster Engineering Company 389
Foxboro Company, The 48
Gardner-Denver Company 103
Gar Wood Industries, Inc. 378
Garrett Oil Tools, Inc. 315
General American Transportation Corporation 212
General Electric Co., Electronic Dept. 132
Globe Company, The 355
Goodall Rubber Company 355
Goodyear Tire & Rubber Company 9
Gordon Co., Claud S. 434
Gott Mfg. Co., H. P. 341
Grancell, L. H. 395
Graver Tank & Mfg. Co., Inc. 137
Great Lakes Corporation 57
Griffenhagen & Associates 380
Grinnell Company, Inc. 30
Grip-Tite Manufacturing Co. 302
Grove Regulator Co. 13
Guiberson Corporation 386
H & L Tooth Company 276
Haering & Co., Inc., D. W. 316
Halliburton Oil Well Cementing Co. 7
Harco Corporation, The 103
Harnischfeger Corp. 82
Harrisburg Steel Corporation 304
Hawthorne, Inc., Herb J. 341
Helicoid Gage Division, American Chain & Cable Co. 239
Hercules Motors Corporation 219
Hewitt Rubber Division, Hewitt-Robins, Incorporated 285
Hindeviller Tool Co., Div., H. K. Porter Company, Inc. 164
Homestead Valve Manufacturing Co. 22
Honan-Crane Corp. 387
Houston Contracting Company 329
Houston Ready-Cut House Co., Inc. 432
Hudson Engineering Corporation 311, 312
Huey & Co., S. E. 389
Hughes Tool Co. Back Cover
Independent Exploration Co. 245
Inferno Co., The 397, 410
Ingersoll-Rand 145
Insley Manufacturing Corporation 159
International Harvester Co. 220
International Nickel Company, Inc. The 37
Jacobson, E. C. 400
Jensen Brothers Mfg. Co. 337
Jerguson Gage & Valve Co. 405
Johnson Motors 51
Johnston & Jennings Co., The, Division of Pettibone Mulliken Corp. 253
Johnston Testers, Inc. 104
Jones & Laughlin Supply Co. 29
Jones Company, The S. M. 64
Joy Manufacturing Company 43
Kelite 339
Kelley Company, Ben F. 439
Kellogg Co., The M. W. 111 to 118
Kemp Mfg. Co., The C. M. 286
Kerrigan Iron Works, Inc. 434
Kidde & Company, Inc., Walter 140
Kieley & Mueller, Inc. 141
Kinsbach Tool Co., Inc. 377
Kiemp Metal Grating Corporation 308
Koch Engineering Company, Inc., The 404
Koppers Company, Inc. 56
Landis Machine Co., The 11
Lane-Wells Company 35
Larkin Packer Company, Inc. 297
Layne & Bowler, Inc. 251
LeBus International Engineering, Limited 318
Lehmann Machine Company 126
Le Roi Company 66, 67
Leslie Co. 110
Levingston Shipbuilding Company 308
Linde Air Products Company
A Division of Union Carbide and Carbon Corp. 39
Lloyd Metal Foundry Co. 399
Lufkin Foundry & Machine Co. 75
Lummus Co., The 15
Lunkenheimer Co., The 131
Magnet Cove Barium Corp. 382
Maintenance Engineering Corp. 108
Mall Tool Company 399
Manhattan Rubber Division, Raybestos-Manhattan, Inc. 39
Manning, Maxwell & Moore, Inc. 119
Mansel 385
Marley Company, Inc., The 160
Marlow Pumps 399
Marsh Instrument Co. 61
Martin & Company, Chas. 323
Martin-Decker Corp. 314
Mathieson Chemical Corporation 98
Maxim Silencer Company 161
Mayo Hotel, The 399
McCord Corporation 324
McCullough Tool Company 353
Mercoid Corp., The 303
Merritt Tool Company 292
Metal Goods Corporation 59
Metal Textile Corporation 347
Mid-Continent Supply Company 395
Midwest Piping & Supply Co., Inc. 288
Miller Electric Manufacturing Co. 418
Minneapolis-Honeywell Regulator Co., Industrial Division 134, 135
Minneapolis-Moline 14
Monsanto Chemical Company 21
Moore Corporation, Lee C. 324
Motorola, Inc. 128
Mundet Cork Corporation 276
Murdock Tank & Mfg. Co. 434
Nash Engineering Co. 133
National Airoil Burner Co., The 357
National Bank of Tulsa 406
National Supply Co., The 87, 88, 89, 90
Naylor Pipe Company 162
Norris Brothers, Inc. 402
O T M Co. 271
Oakite Products, Inc. 278
Ohio Injector Company 235
Oil Base, Inc. 240, 247
Oil Center Tool Co. 431
Oil Equipment Mfg. Co., Inc. 274
Oil Well Mfg. Corp. 328
Okadee Company 414
Orbit Valve Company 350
Otis Pressure Control, Inc. 433
Pacific Valves, Inc. 425
Page Fence Association 415
Paris Distributor, Inc., Henry H. 431
Parkersburg Rig & Reel Co. 158
Peerless Mfg. Co. 277
Pelton Water Wheel Co. 333
Penberthy Injector Co. 402
Penn Controls, Inc. 345
Perrault Brothers 400, 439
Petro-Chem Development Co., Inc. 385
Petroleum Electric Power Assn. 61
Petroleum Rectifying Company 53
Petty Geophysical Engineering Company 394
Pioneer Rubber Co., The 400
Pittsburgh Corning Corporation 91
Powell Co., The Wm. 139
Products Research Service, Inc. 256
Pyrene Manufacturing Company 418
Quincy Compressor Co. 381
R-S Products Corporation 190
Rasmussen Mfg. Co. 319
Raybestos-Manhattan, Inc., Manhattan Rubber Division 39
Raybestos-Manhattan, Inc., Packing Div. 147
Raymond Concrete Pile Co. 45
Rector Well Equipment Co., Inc. 97, 434
Reed Roller Bit Company 427
Refinery Supply Co., The 302
Reilly Tar & Chemical Corporation 270
Republic National Bank of Dallas 411
Republic Steel Corporation 149
Republic Supply Company 388
Research Vacuum Supply Company 418
Ridge Tool Company, The 137
Robbins & Myers, Inc. 322
Rockwood Sprinkler Co. 188, 189
Roebling's Sons Company, John A. 17
Rolo Manufacturing Co. 360
Royal Bank of Canada, Inc. 437
Rust-Oleum Corporation 15
S & R Tool and Supply Co. 366
Sarco Company, Inc. 93
Schield Bantam Company 391
Schlumberger Well Surveying Corp. 155
Second National Bank of Houston 343
Security Engineering Co., Inc. 381
Seismic Exploration, Inc. 385
Seismograph Service Corp. 310
Service Foundry, A Division of Avondale Marine Ways, Inc. 430
Shaffer Tool Works 413
Shell Oil Company 153
Sivalls, Tanks, Inc. 420
Skinner Company, M. B. 77
Smith Corporation, A. O. 55
Smith Oil Tool Co., H. C. 394
Snap-On Tools Corporation 390
South Texas National Bank 360
Southern Mill & Mfg. Co. 321
Spang-Chalfant Division of The National Supply Co. 80
Sperry-Sun Well Surveying Co. 138
Standard Oil Co. of California 94
Standard Oil Company (Indiana) 44
Standco Brake Lining Co. 397
Starrett Company, The L. S. 405
Steel Forgings, Inc. 400
Stewart & Stevenson Services, Inc. 227
Sun Shipbuilding & Dry Dock Company 37
Superior Combustion Industries, Inc. 85
Taylor Woodrow (Building Exports), Ltd. 80
Texas Engineers 311
Technical Oil Tool Corp., Ltd. 301
Templeton, Kenly & Co. 397
Texas Company, The 130
Thomas Flexible Coupling Co. 388
Thompson Tool Co. 338
Thornhill-Craver Co. 159
Tidelands Exploration Co. 264
Timken Roller Bearing Company Front Cover
Tobin Aerial Surveys, Edgar 335
Torrington Company, The 58
Tretolite Company 8
Turner Brothers Asbestos Co., Ltd. 306
Turner Uni-Drive Company 432
Twin Disc Clutch Co. 410
Ultra Violet Products, Inc. 397
Underwood Corporation 421
Union Carbide and Carbon Corporation, The Linde Air Products Company 39
Unit Rig & Equipment Co. Inside Front Cover
United Engineers, Inc. 428
United Geophysical Company 333
United States Rubber Company 154
Universal Oil Products Co. 238, 239
Victaulic Co. of America 433
Victor Equipment Company 352
Victor Products Corp. 405
Vogt Machine Co., Henry 149
Voss Co., Inc., J. H. 399
Wagner Electric Corporation 25
Walworth Co. 8
Watson-Stillman 270
Waukesha Motor Company 94
Weatherhead Company, The 410
Well Equipment Mfg. Corp. 315
Well Instrument Developing Co. 343
Westinghouse Electric Corp. 143, 143
Wheatley Pumps & Valves, Frank 393
Whesland Company, The 75
Whitmor Homebuilders, Inc. 439
Whitney National Bank of New Orleans 377
Wichita Falls Foundry & Machine Co., Inc. 331
Wickes Boiler Co., The 367
Wickwire Spencer Steel Division, Colorado Fuel and Iron Corp. 83
Wico Electric Company 389
Williams Brothers 393
Williamson, Inc., T. D. 397
Wilson Manufacturing Co., Inc. 234, 235
Wilson Supply Co. 282, 283
Wisconsin Motor Corporation 433
W-K-M Company 401
Wolverine Tube Division Calumet & Hecla Consolidated Copper Company 60
Woodward Governor Company 123
Worthington Corp. 122, 151
Wyatt Metal & Boiler Works Inside Back Cover
Yarnall-Waring Company 94
Zachry Co., H. B. 340
Zink Company, John 281



When you specify pipe protection... be sure you're getting

an extra saving

...not an extra expense

You can buy the finest Coal-Tar Enamel—but if it doesn't fulfill your exact requirements and your exact specifications, or if it isn't properly applied, it can cost you a lot of money *without* giving you the protection you want.

That's why it pays to keep Barrett in the picture *all the way* on your job. In the planning stage, call in a Barrett technical advisor to help you select the right enamel. During application, use the free Barrett Field Manual, which gives detailed procedures for proper application—from cleaning to back-filling. And remember to take advantage of the on-the-spot service of a Barrett Technical Service Representative whenever necessary.

Remember: even the finest enamels must be properly applied for proper protection.

Check these advantages of **BARRETT* COAL-TAR ENAMEL**

1. The right product and procedure for every gas and oil pipeline need
2. Resistance to extreme atmospheric temperatures
3. High ductility and flexibility
4. High resistance to soil stresses
5. High dielectric properties
6. Moisture impermeability
7. Resistance to gas and petroleum attack
8. Easy availability and application
9. On-the-job technical assistance
10. Dependable deliveries

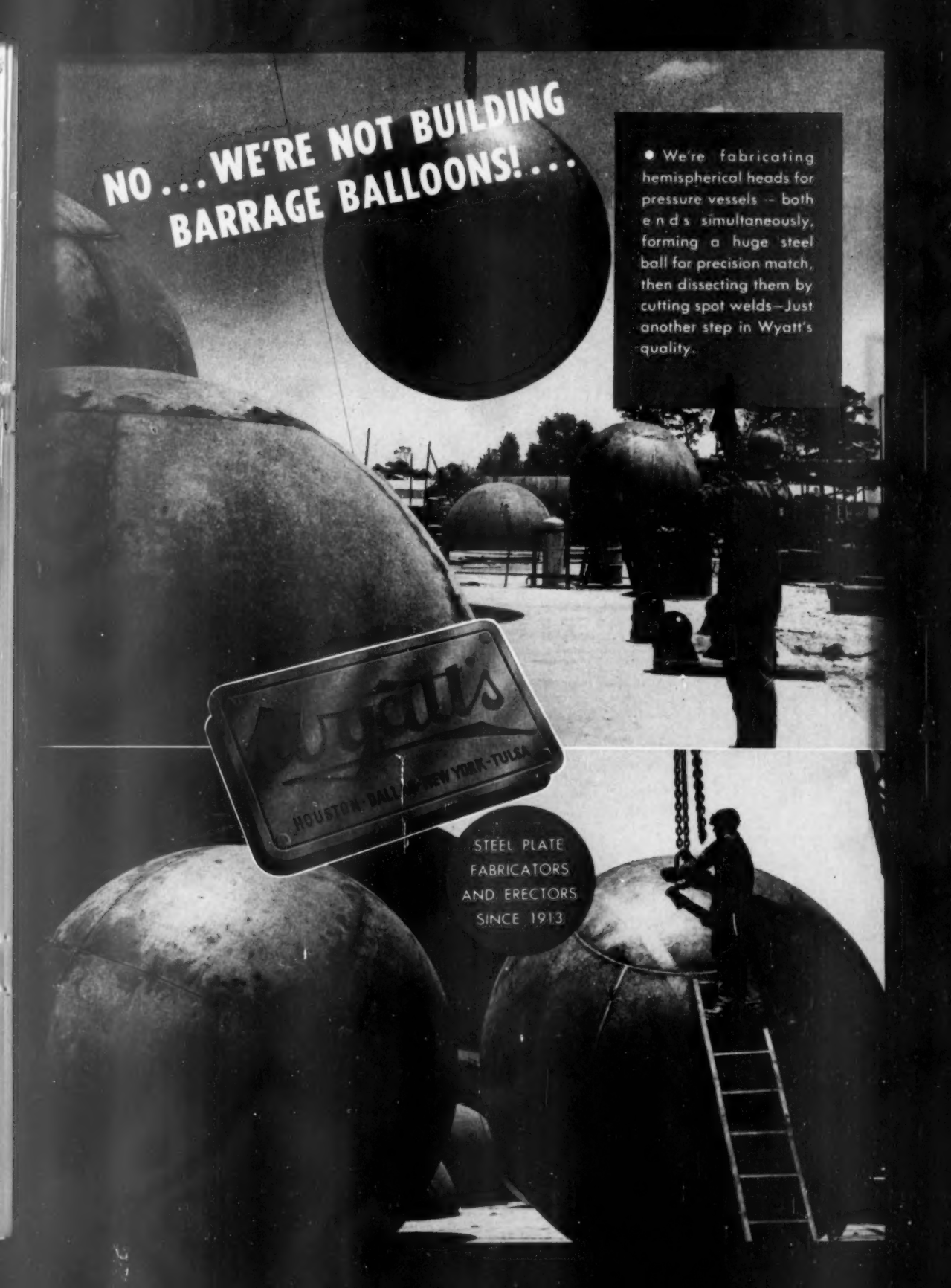
Write, wire or phone for complete information about Barrett's pipe-protection products and services.

Barrett

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

In Canada:
The Barrett Company, Ltd.
5551 St. Hubert St., Montreal, Que.

*Reg. U. S. Pat. Off.


NO . . . WE'RE NOT BUILDING BARRAGE BALLOONS! . . .
• We're fabricating hemispherical heads for pressure vessels — both ends simultaneously, forming a huge steel ball for precision match, then dissecting them by cutting spot welds—Just another step in Wyatt's quality.
Wyatt's
HOUSTON · BALTIMORE · NEW YORK · TULSA
STEEL PLATE FABRICATORS AND ERECTORS SINCE 1913

Unretouched frame from Hughes Research Film showing explosive effect as heel tooth penetrates formation.

Hughes advances tooth action research

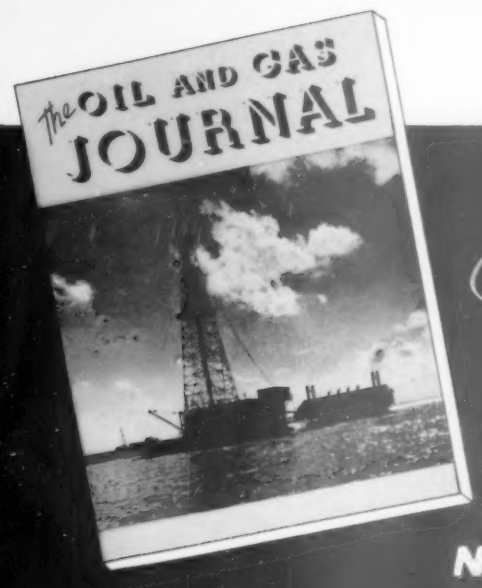
Knowing exactly what happens when bit teeth bite into the formation is essential in perfecting bit design.

Every means that will clarify tooth action is used by Hughes engineers. This includes the study of bottom hole patterns, data obtained from millions of bits run on thousands of rigs, and motion pictures taken with super high speed camera equipment.

This is work in which small improvements are important. For instance, a design change that leads to the removal of 1/64" more formation on each revolution of the bit can increase the penetration rate approximately five feet per hour at a rotary speed of 60 to 70 RPM.

The study of tooth action is part of HUGHES' overall research program dedicated to the idea that *improvement is a continuing process* . . . and that the perfect bit is still to be built.

HUGHES Tri-Cone® ROCK BITS



Journal-guide

GULF COAST OIL

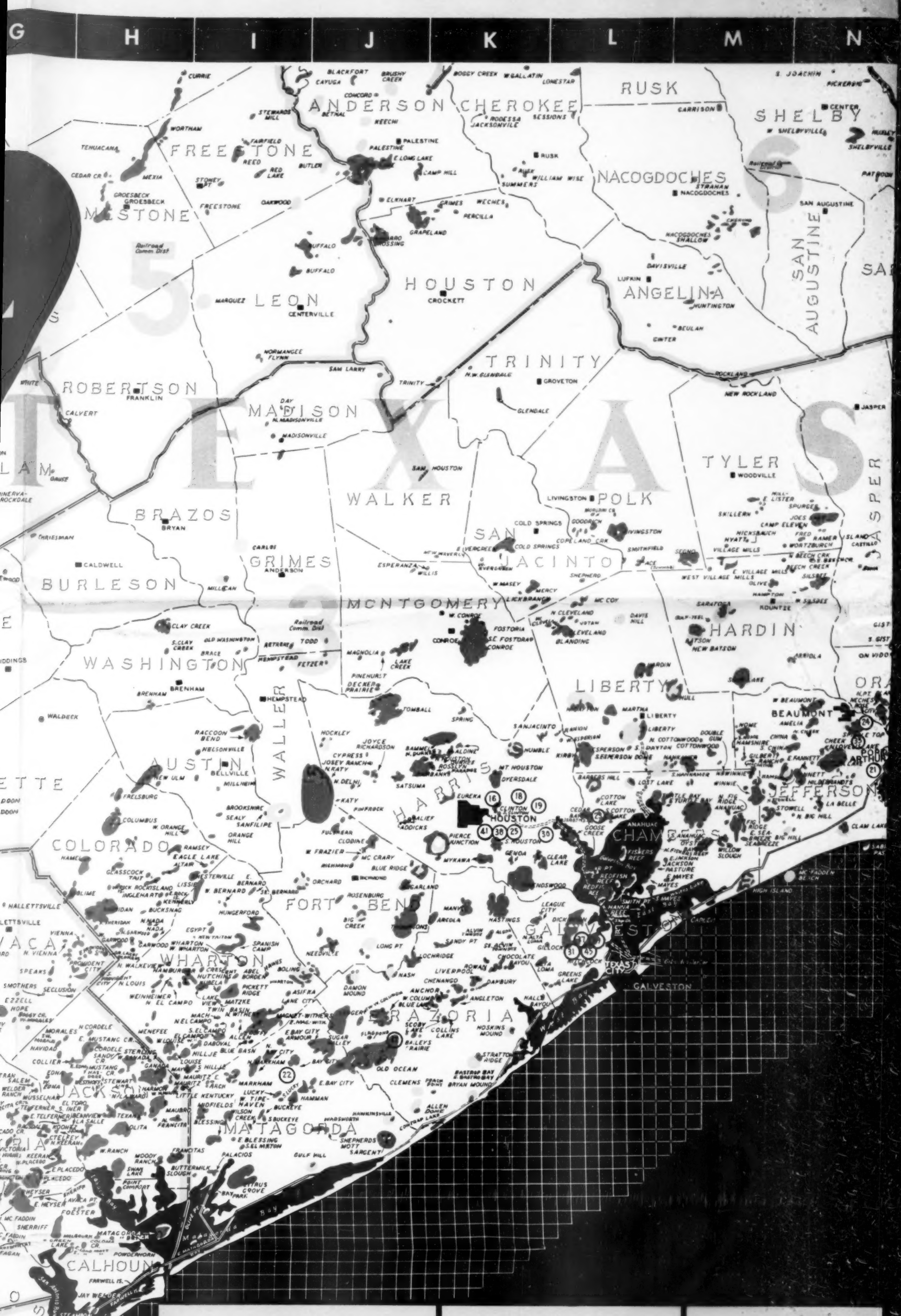
Oil and Gas Fields, Refineries, Natural-Gasoline, Cycling Plants,

Supplement to THE OIL AND GAS JOURNAL, issue of June 16, 1952.
Copyright, 1952, The Petroleum Publishing Company, Tulsa, Okla.

Oil Fields | Gas Fields | Salt Domes | (1) Refineries

GILLESPIE | BLANCO | TRAVIS | LEE | BASTROP | KERR | KENDALL | HAYS | CALDWELL | FAYETTE | BANDERA | COMAL | GUADALUPE | GONZALES | BEXAR | MEDINA | WILSON | DE WITT | FRIO | ATASCOSA | KARNES | GOLIAD | BEE | REFUGIO | LA SALLE | McMULLEN | LIVE OAK | SAN PATRICIO | ARANSAS | JIM WELLS | NUECES | WEBB | DUVAL | ZAPATA | JIM HOGG | BROOKS | KENEDY | STARR | HIDALGO | WILLACY | CAMERON

GULF COAST OIL BASINS


G
H
I
J
K
L
M
N
ANDERSON
CHEROKEE
RUSK
SHELBY
FREESTONE
NACOGDOCHES
SAN AUGUSTINE
HOUSTON
ANGELINA
LEON
TRINITY
ROBERTSON
MADISON
TYLER
WALKER
POLK
BRAZOS
GRIMES
SAN JACINTO
BURLESON
MONTGOMERY
HARDIN
WASHINGTON
LIBERTY
BEAUMONT
JEFFERSON
AUSTIN
WALLER
HARRIS
COLORADO
FORT BEND
GALVESTON
WHARTON
BRAZORIA
JACKSON
MATAGORDA
CALHOUN
CURRIE
BLACKFORT
CAYUGA
BRUSHY CREEK
CONCORD
BETHAL
KEECHI
BOGGY CREEK
GALLATIN
LONESTAR
RODESSA
JACKSONVILLE
SESSIONS
GARRISON
S. JOACHIN
PICKERING
CENTER
SHELBYVILLE
MUSEY
PATROON
WORTHAM
TEHUACANA
FAIRFIELD
REED
BUTLER
PALESTINE
E. LONG LAKE
RED LAKE
CAMP HILL
RUSK
ALTOM
WILLIAM WISE
SUMMERS
CEDAR CR.
MEXIA
STONEY
GROESBECK
FREESTONE
OAKWOOD
ELKHART
GRIMES
WECHES
PERCILLA
GRAPELAND
BUFFALO
BOGGY CROSSING
STRAHAN
NACOGDOCHES
NACOGDOCHES SHALLOW
SAN AUGUSTINE
DAVISVILLE
LUFKIN
HUNTINGTON
BEULAH
GINTER
MARQUEZ
CENTERVILLE
CROCKETT
NORMANGEE
FLYNN
SAM LARRY
TRINITY
M.W. GLENDALE
GROVETON
GLENDALE
ROCKLAND
NEW ROCKLAND
JASPER
WHITE
FRANKLIN
CALVERT
DAY
N. MADISONVILLE
MADISONVILLE
SAN HOUSTON
WOODVILLE
LIVINGSTON
MILL-LISTER
SPURGER
SKILLERN
JOES
CAMP ELEVEN
NICKSBAUCH
FRED
RAMER
HYATT
WORTZBURCH
VILLAGE MILLS
BEECH CRK.
BEECH CREEK
SILSBEE
OLIVE
HAMPTON
BRYAN
CHRIESMAN
CALDWELL
CARLOS
ANDERSON
MILLICAN
ESPERANZA
WILLIS
COLD SPRINGS
GOODRICH
COPELAND CRK.
IVINGSTON
EVERGREEN
SMITHFIELD
ACE
SEGNO
WEST VILLAGE MILLS
SHEPHERD
W. MASEY
LICKSBRANCH
MERCY
MC COY
CLAY CREEK
S. CLAY CREEK
OLD WASHINGTON
BRACE
RETREAT
TODD
HEMPSTEAD
FEYZER
MAGNOLIA
LAKE CREEK
PINEHURST
DECKER PRAIRIE
CONROE
W. CONROE
FOSTORIA
S.E. FOSTORIA
CONROE
N. CLEVELAND
CLEVELAND
BLANDING
DAVIS HILL
SARATOGA
KOUNTZE
WAYSIDE
WILDWOOD
BRENHAM
WALDECK
HEMPSTEAD
TOMBALL
SPRING
SANJACINTO
HUMBLE
HOCKLEY
RACCOON BEND
NELSONVILLE
BELLVILLE
NEW ULM
MILLHEIM
FRELSBURG
COLUMBUS
W. ORANGE HILL
ORANGE HILL
SEALY
SANFILIPE
BROOKSHIRE
JOYCE RICHARDSON
CYPRESS
JOSEY RANCH
N. KATY
N. DELHI
SATSUMA
KATY
PINROCK
ALDINE
HOUSTON
ROSSLYN
RANKS
MT. HOUSTON
DYERSDALE
EUREKA
CLINTON
HOUSTON
S. HOUSTON
PIERCE JUNCTION
GENOA
MYKAWA
CLEAR LAKE
GOOSE CREEK
ANAHUAC
CHAMBERS
FISHERS REEF
REDFISH REEF
SMITH PT.
HANNA REEF
E. JACKSON PASTURE
E. MAYES
MAYES
W. MAYES
HIGH ISLAND
MC FADDEN BEACH
S. MAYES
S. E. MAYES
S. E. JACKSON
WILLOW SLOUGH
BIG HILL
SEABREEZE
CLAM LAKE
LA BELLE
STOWELL
N. BIG HILL
E. FANNETT
FANNETT
HILDEBRANDTS
BEAUMONT
AMELIA
CHINA
CHEEK
ARTHUR
ORANGE
LOST LAKE
WINNIE
HAMSHIRE
N. COTTONWOOD
COTTONWOOD
DAYTON
S. COTTONWOOD
GUM
S. SPERSON
S. SPERSON DOME
KIRBY
HAMSHER
NEWINNICK
BARBERS HILL
COTTON LAKE
CEDAR BAYOU
ANAHUAC
FISHING
WILLOW SLOUGH
FISHING
FISHING
FISHING

O
P
Q
R
S
T
U
DE SOTO
NATCHITOCHES
WINN
LA SALLE
CATAHOULA
CONCORDIA
TENSAS
JEFFERSON
SABINE
GRANT
ADAMS
VERNON
RAPIDES
AVOYELLES
WILKINSON
LOUISIANA
BEAUREGARD
ALLEN
EVANGELINE
ST LANDRY
POINTE COUPEE
WEST FELICIANA
EAST FELICIANA
CALCASIEU
JEFFERSON DAVIS
ACADIA
LAFAYETTE
ST MARTIN
IBERIA
VERMILION
CAMERON
WEST CAMERON
EAST CAMERON
VERMILION
EUGENE ISLAND
ASSUMPTION
ST MARYS
TERREBONNE
LIVINGSTON
WEST BATON ROUGE
EAST BATON ROUGE
NEWTON
JACKSON
NEW ROADS
ST FRANCISVILLE
WOODVILLE
FAYETTE
ALEXANDRIA
LEESVILLE
MARKSVILLE
HARRISONBURG
NEWTON
DE RIDDER
OBERLIN
LAKE CHARLES
JENNINGS
CROWLEY
LAFAYETTE
OPELOUSAS
NEW IBERIA
MORGAN CITY
HOUMA
BATON ROUGE
NAPOLEONVILLE
PLAQUEMINE
WHITE CASTLE
GUEYDAN
ABBEVILLE
ERATH
MIDLAND
MAMOU
VILLE PLATTE
WASHINGTON
GRAND LAKE
CALCASIEU LAKE
LAKE ARTHUR
LAKE CHARLES
SWEET LAKE
BIG LAKE
BLACK BAYOU
GUM COVE
PHOENIX LAKE
CAMERON MEADOWS
HOLLY BEACH
JOHNSON'S BAYOU
GRAND CHENIER
MUD BAYOU
LITTLE CHENIERE
PECAN ISLAND
WHITE LAKE
MALLARD BAY
OUTSIDE ISLAND
VERMILION BAY
MARSH ISLAND
LAKE ISLAND
HORSESHOE BAYOU
FRESH WATER BAYOU
BELLE ISLAND
RABBIT ISLAND
ATCHAFALAYA LAKE
POINTE AU FER
BAY JUNOP
COON POINT
TURTLE BAYOU
DEER ISLAND
BAYOU PENCHANT
BAYOU CARLIN
COTE BLANCHE
JEANERETTE
AVERY ISLAND
WEEKS ISLAND
TIGRE LAGOON
JEFFERSON ISLAND
CHARENTON
LAKE VERRET
PATTERSON
BATEMAN LAKE
BAYOU LALLE
BAYOU BOEUF
BAYOU TECHE
BAYOU BLUE
LAKE MONGOULOIS
LAKE CHICOT
FAUSSE PT
LAURIEL RIDGE
WHITE CASTLE
ST MARTINVILLE
LAFAYETTE
DUSON
SCOTT
CARENCRO
BROUSSARD
YOUNGSVILLE
SUNSET
OPELOUSAS
PORT BARRE
GRAND COTEAU
KROTZ SPRINGS
ARNAUDVILLE
LEWISBURG
SHUTESTON
PLAUCHEVILLE
BAYOU SORREL
BAYOU GOULA
BAYOU MANCHAC
PLAQUEMINE
BELLE ROSE
NAPOLEONVILLE
PIERRE PART
LOCKPORT
LOCKPORT JUNCTION
THIBODAUX
LABADIEVILLE
RACELAND
GONZALES
GARYVILLE
PRAIRIEVILLE
DONALDSONVILLE
SORRENTO
GEISMAR
SUNSHINE
ST GABRIEL
BURTHVILLE
PORT ALLEN
ADDIS
BRUSLY
ZACHARY
BAKER
CLINTON
JACKSON
ST FRANCISVILLE
NEW ROADS
LIVONIA
MORGANZA
ROSEDALE
BATON ROUGE
UNIVERSITY
HOPE VILLA
MAILLOU
BURTHVILLE
ST GABRIEL
SUNSHINE
GEISMAR
DONALDSONVILLE
SORRENTO
PRAIRIEVILLE
GONZALES
GARYVILLE
RACELAND
THIBODAUX
LABADIEVILLE
LOCKPORT
LOCKPORT JUNCTION
PIERRE PART
BELLE ROSE
NAPOLEONVILLE
PLAQUEMINE
BAYOU SORREL
BAYOU GOULA
BAYOU MANCHAC
PLAUCHEVILLE
LEWISBURG
SHUTESTON
ARNAUDVILLE
PORT BARRE
KROTZ SPRINGS
GRAND COTEAU
OPELOUSAS
SUNSET
YOUNGSVILLE
BROUSSARD
CARENCRO
SCOTT
LAFAYETTE
DUSON
MARKSVILLE
BORDELONVILLE
EOLA
DAVID HASS
GLENMORA
PINE PRAIRIE
REGDELL
BAYOU
VILLE PLATTE
OBERLIN
N. ELTON
BASILE
N. TEPETATE
W. TEPETATE
E. TEPETATE
TEPETATE
S. BAYOU MALLET
BAYOU MALLET
BAYOU SAVOY
S. LEWISBURG
NW. BRANCH
S. CROWLEY
N. CROWLEY
MIDLAND
MAMOU
VILLE PLATTE
WASHINGTON
OPELOUSAS
PORT BARRE

MISSISSIPPI

J-4
F-10
B-8
F-7
N-1
F-6
D-10
K-5
A-6
A-6
E-6
C-7
F-8
C-10
C-10
K-1
E-6
B-8
B-7
B-7
E-8
E-6
E-6
B-8
C-9
D-10
C-5
O-4
N-1
I-5
C-7
C-8
D-9
X-9
K-4
J-3
D-10
B-7
G-6
G-6
G-6
C-5
J-5
D-6
F-7
F-7
E-6
G-5
N-4
H-6
F-10
C-8
N-4
N-4
E-6
F-7
C-8
D-5
H-6
D-8
E-6
C-7
G-6
F-7
N-1
G-5
B-5
I-4
D-9
D-5
C-5
B-6
G-6
N-3
D-8
C-7
H-4
C-7
B-8
I-4
D-7
E-6
B-8
C-5
E-9
C-8
I-4
I-4
I-1
F-4
I-1
F-6 & 7
A-8
D-5
A-8
I-3
D-7
C-7
C-7
C-7
B-9
E-8
I-4
C-7
B-8
J-4
E-7
K-5
C-7
D & E-6
E-9
C-8
I-4
I-4
I-3
J-4
F-10
G & H-5
G-5
B-5
H-5
G-5
G-6
F-7
B-9
J-4
E-7
H-6
B-7
G-3
C-7
B-6
E-6
E-6
K-1
D-6

Sabine, Newton N-3
Sabine Pass, Jefferson N-4
Sacatom, Starr B-9
Salem, Victoria G-5
Sally, DeWitt F-6
Salmar, Guadalupe E-4
Salt Flat, Caldwell E-4
Salt Lake, Aransas G-7
Sam Fordyce, Hidalgo & Starr C-10
Sam Fordyce, North, Hidalgo & Starr C-10
Sam Houston, Walker J-3
Sam Larry, Madison J-2
San Caja, McMullen C-7
San Diego, Jim Wells D-7
San Diego, North, Duval D-7
San Domingo, Bee E-6
San Eduardo, Jim Hogg C-9
San Felipe, Waller I-4
San Jacinto, Harris K-4
San Jose, McMullen C-7
San Miguel Creek, McMullen C-6
San Pablo, Jim Hogg B-8
San Ramon, Hidalgo C-9
San Salvador, Hidalgo D-10
Sandin, Jim Wells D-7
Sandy Creek, Jackson H-5
Sandy Point, Brazoria K-5
Santa Elena, Starr C-9
Santa Fe Ranch, Brooks D-9
Santa Fe, South, Hidalgo X-9
Santa Maria, Hidalgo D-10
Santo Domingo, Starr B-10
Saranosa, Duval B-7
Saranosa, West, Duval C-7
Saratoga, Hardin M-3
Sarco, Goliad F-6
Sarco Creek, West, Goliad F-6
Sargent, Matagorda J-6
Sarita, Kenedy E-8
Satsuma, Harris J-4
Saxet, Nueces E-7
Schott, Webb B-8
Schultz, Live Oak D-6
Schwartz, Live Oak E-7
Scoby Lake, Brazoria R-5
Scott, Bee E-6
Scott & Hopper, Brooks D-9
Seabreeze, Chambers M-4
Sealy, Austin I-4
Seclusion, Lavaca G-5
Seeligson, Jim Wells & Kleberg D-8
Segno, Polk M-3
Seguin, Guadalupe D-4
Seiler, Jim Wells D-7
Sejita, Duval C-8
Sellers, Jim Wells D-7
Semmes, Starr B-10
Sessions, Cherokee L-1
Seven Sisters, Duval C-7
Seven Sisters, South, Duval C-7
Seventy Six, Duval C-7
Severiano, Duval B-8
Shelbyville, Shelby N-1
Shelbyville, West, Shelby N-1
Shepherd, San Jacinto L-3
Shepherds Mott, Matagorda J-6
Sheridan, Colorado H-5
Sheridan, South, Colorado H-4
Sheriff, Calhoun G-6
Shield, Nueces E-8
Shiner, Hardin N-3
Shiner, Hardin M-3
Sidney, Madison K-4
Sidney, Nueces C-7
Sidney, Starr K-4
Sidney, Starr K-3
Sidney, Starr K-2
Sidney, Starr K-1
Sidney, Starr J-1
Sidney, Starr I-1
Sidney, Starr H-1
Sidney, Starr G-1
Sidney, Starr F-1
Sidney, Starr E-1
Sidney, Starr D-1
Sidney, Starr C-1
Sidney, Starr B-1
Sidney, Starr A-1
Sidney, Starr A-2
Sidney, Starr A-3
Sidney, Starr A-4
Sidney, Starr A-5
Sidney, Starr A-6
Sidney, Starr A-7
Sidney, Starr A-8
Sidney, Starr A-9
Sidney, Starr A-10
Sidney, Starr A-11
Sidney, Starr A-12
Sidney, Starr A-13
Sidney, Starr